

EVALUATING REGENERATION IMPACTS OF THE CHANNEL TUNNEL RAIL LINK

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ABSTRACT

The term regeneration tends to suggest a broad range of changes including the rebuilding of local economies; an influx of productive investment and new jobs and the development of new property. This paper focuses on regeneration impacts expressed in terms of the economic and land-use effects brought by the introduction of High Speed Rail (HSR) systems. Specifically, the implicit price of HSR accessibility is estimated using regression functions for the housing and office markets using the Channel Tunnel Rail Link in England as a case study. The main outcome of this analysis is that there is a correlation between property prices and distance to the nearest HS station.

Keywords: Regeneration impacts, High Speed Rail, land-use impacts, economic impacts

1. INTRODUCTION

The term urban regeneration tends to suggest a broad range of desired changes including the rebuilding of local economies by an influx of productive investment and new jobs, the development of new property and the refurbishment of existing buildings. It also suggests construction of new housing, improvements in environmental quality, and providing a wider range of community facilities and a strengthened network of community organisations (Halcrow Fox Associates, 1990). The concept of *regeneration* for the purposes of this paper is seen to be most appropriately measured by levels of new investments in transport infrastructures. This has been the source of much previous work (see, for example, Banister and Berechman, 2000).

Specifically, the research reported here tries to examine impacts on the property market, and on residential and activity location, brought about by investments in large scale transport projects, such as High Speed Rail (HSR) systems. The latter are here conceived as trigger for urban regeneration, i.e. the private sector response to public investments. HSR connections were developed first in Japan in 1964 and have been present in Europe (originating with France) for the past three decades, but in the UK only for the past decade. HSR networks are found or being developed in Belgium, Holland, Spain, Italy and Russia. The Korean HSR network was opened in 2004, followed by Taiwan in January 2007. China commenced construction at the end of 2006. It is expected that the European HSR network will expand substantially across the continent over the next few decades, connecting cities and regions even more effectively and faster than before (see, for example, Campos et al., 2009).

Promoters of HSR line development usually stress its benefits as meeting a growing demand for travel while reducing congestion and pollution and supporting spatial planning for improving regional economies. Impacts of HSR fall primarily on the places actually served: the main cities and other towns, mostly larger ones. But this does not mean that building a line or opening a station automatically brings benefits; the circumstances have to be assessed and the opportunities sought out in each case. Thus the effects depend heavily on the design of the new lines, the pattern of routes and services operated and the economic structures and plans of the cities served. It follows that design for a HSR line has to take the wider potential effects into account to justify its investment in both direct (financial) and indirect terms. The indirect effects are important in assessing both the role of public investment and the need for public action in complementary fields, notably city and regional development planning (Bonnafous, 1987; Greengauge 21, 2006).

This paper focuses on the impacts of HSR systems both on property values and activity location. Specifically, the implicit price of HSR accessibility is estimated using regression functions for the housing, office and shop markets considering as a case study the Channel Tunnel Rail Link (CTRL) in England. Kent has developed its HSR link, High Speed 1, from the Channel Tunnel at Folkestone to London St Pancras via Ashford and Ebbsfleet. The main outcome of this analysis is that there is a correlation between property prices and distance to the nearest HS station. This is the case for houses. For offices it seems that they

follow a different “behaviour” which is mainly correlated to the property being in Inner London. An evaluation of land use impacts has been taken into account as well, in terms of the CTRL impacts on residents and employee jobs location.

This paper is organised as follows. Section 2 deals with the description of the Channel Tunnel Rail Link (CTRL) and the qualitative analysis of its regeneration impacts. In section 3 the CTRL impacts on property values have been computed, while in section 4 evidence of the CTRL impacts on activity location is analysed in terms of residents and employee jobs location. Finally in section 5 conclusions and further perspectives are reported.

2. THE CHANNEL TUNNEL RAIL LINK (CTRL)

The opening of the Channel Tunnel in 1994 led to the prospect of HSR services operating from London to Paris and Brussels. Although HST lines to access the Channel Tunnel were provided in France from the outset, it has taken time for similar infrastructure to be provided in England. High Speed 1 (HS1), officially known as the Channel Tunnel Rail Link (CTRL), is a 108 km (67 mile) HS railway line running from London through Kent to the British end of the Channel Tunnel. In 1998, London & Continental Railways (LCR), the company that two years before won the contract to build and operate the new HS line, ran into serious financial problems in 1998 and asked the UK Government for more support. This resulted in the CTRL being split into two sections.

Section 1 of the Channel Tunnel Rail Link, opened on 28 September 2003, is a 74 km (46 mile) section of HS track from the Channel Tunnel to Fawkham Junction in north Kent. The section's completion cut the London–Paris journey time by around 21 minutes, to 2h 35minutes. After completion, Eurostar trains continued to use suburban lines to enter London, arriving at Waterloo International.

Section 2 of the project opened on 14 November 2007 and is a 39.4 km (24 mile) stretch of track from the newly built Ebbsfleet station in Kent to London St Pancras. Completion of the section cut journey times by a further 20 minutes (London–Paris in 2h 15minutes; London–Brussels in 1h 51m). The Waterloo International terminal closed upon opening of the section in November 2007, all Eurostar trains now serving St Pancras instead. Stratford International will serve the main site for the 2012 Summer Olympics. Figure 1 shows the route map of the CTRL. The new line passes through several large sites with potential for inward investment opportunities. The public sector spend on the project was an acknowledgement of the wider economic benefits that the rail line would bring in terms of new housing, offices, additional jobs, leisure and cultural facilities.¹

¹ See <http://dft.gov.uk/pgr/rail/pi/ctrl/theregenerationbenefitsofthectl>

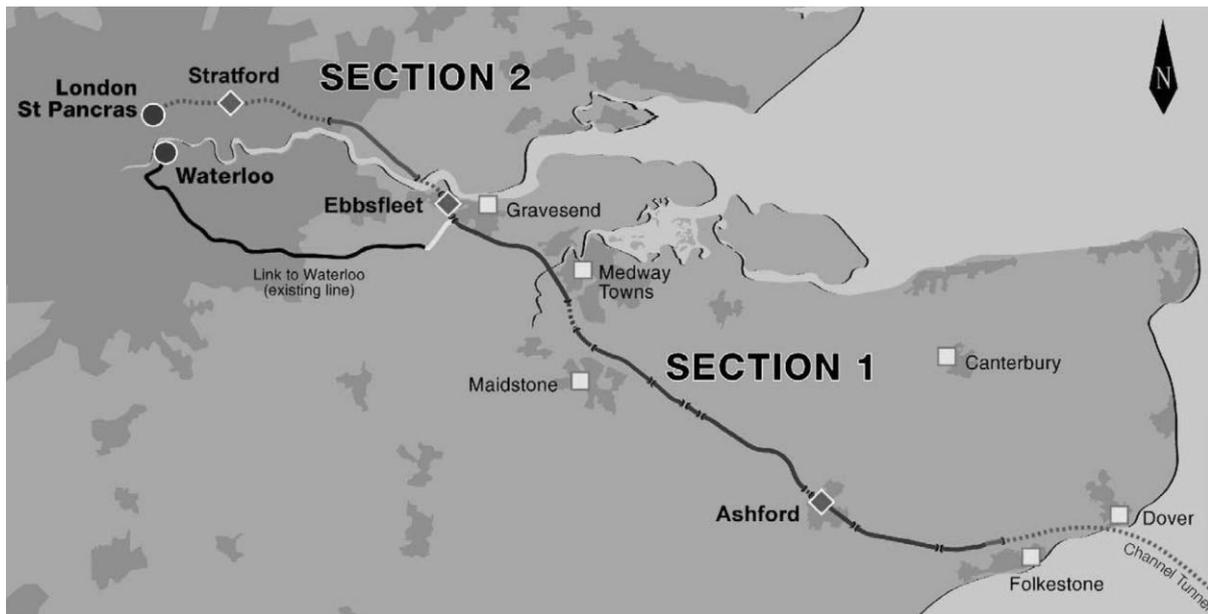


Figure 1 - The route map of the CTRL

The land around King's Cross and St. Pancras stations, for example, presents one of the largest inner city redevelopment opportunities in Europe and proposals include a mix of new build and renovation throughout the area. After an extensive local consultation exercise, in May 2004 the developer Argent St George, now Argent (King's Cross) Limited, in partnership with London & Continental Stations and Property, submitted to the local authority a series of planning and listed building applications for the 58-acre site. The anticipated development will end decades of blight and low quality land use in the area with all the attendant social problems. The proposed development comprises over 8 million sqft of mixed used development including business and employment uses, at least 1,800 new homes, a distinct mix of shops, cafes, bars and restaurants, plus community, health, education, cultural and other facilities.

As with the other major CTRL regeneration projects, the Government benefits with a 50 per cent share of the surplus value created by the developments. In the case of King's Cross Central £150 million has been estimated. Outside central London, new stations in Stratford and Ebbsfleet - in the Thames Gateway area - have also prompted major plans for mixed-use developments in designated 'brownfield' regeneration sites. The proposed CTRL interchange at Stratford station will accelerate the regeneration of the area.

Outline planning consent was obtained in September 2004 for the Stratford City development comprising over 13 million sqft, of mixed-use regeneration on the 125 acres site. The scheme builds on the enhanced international, domestic and local road/rail transport interchange and on existing retail, commercial, leisure and entertainment facilities, which will make Stratford a new centre of commerce for East London.

Regeneration is expected as well in other communities, for example at Ebbsfleet, the new station with its extensive "park and ride" facilities and convenient access to the national

motorway network will complement the regeneration of the Ebbsfleet Valley with a new commercial and retail development promoted by Land Securities. CTRL Domestic services will be a key driver in the regeneration and growth of the Kent Thameside and Medway areas of the Thames Gateway. Over the period to 2016, the Department for Communities and Local Government has identified the potential for 20,000 homes and 40,000 jobs in Ebbsfleet/Kent Thameside and 15,000 new homes in Medway. CTRL Domestic services will give opportunities for both new and existing communities and is a key driver for growth elsewhere along the route where smaller development opportunities are being realised as a result of the catalyst provided by the CTRL.

The Channel Tunnel Rail Link presents the opportunity to provide HS services for commuters into London, with significantly reduced journey times. This will attract new business and employment opportunities and open up access from Kent for employment opportunities in Stratford, the Lower Lea and Docklands, and opportunities for reverse commuting. A new Integrated Kent Franchise will deliver the high speed train services from Kent to St Pancras and will support the new housing developments and economic opportunities in the Thames Gateway Growth Area. These services are planned to commence in late 2009. The new services will also play a crucial role in the 'javelin shuttle' for London's Olympic transport which will move spectators from central London to the Olympic Park in Stratford in under 8 minutes.

CTRL Domestic services will also be a key driver in the development of Ashford, one of the four growth areas identified in the Sustainable Communities Plan. Ashford's strategic location and role as a gateway to Europe will be strengthened with the completion of CTRL Domestic services. Between 2001 and 2016, Ashford Growth Area will deliver 13,000 new houses and 10,300 new jobs. Over the longer term, the Ashford's Future Study concluded that a rate of growth of 31,000 homes supported by 28,000 new jobs to 2031 is realistic. Testing these hypotheses is out of the scope of this paper, while at this stage they are expectations.

3. THE CTRL IMPACTS ON PROPERTY VALUES

Most studies present in the literature have analyzed local transit networks. Empirical studies of the effects of long-distance rail accessibility on real estate prices are relatively rare. Among the exceptions are Armstrong and Rodriguez (2006) who estimated local and regional accessibility benefits of commuter rail services in eastern Massachusetts, while controlling for proximity related negative externalities and other confounding influences. It used GIS to measure both multimodal accessibility to commuter rail stations and distance from the rail right-of-way. The overall results were inconclusive, but estimates of the effect of proximity to commuter rail right-of-way indicated a significant negative effect on property values, which may be related to local noise and crime effects. Bowes and Ihlanfeldt (2001) proposed that railway stations should raise the value of nearby properties since they reduce commuting costs and should therefore be better able to attract retail activity than locations away from stations, other things being equal. Possibly countering these positive effects are negative externalities such as noise as well as less protection against criminals from other

neighbourhoods. Their results – from the Atlanta region suggest that plans to raise urban densities should consider both the direct and the indirect effects of transit stations on the attractiveness of nearby neighbourhoods. Nevertheless, stations that are located sufficiently far away from the urban core will tend to attract new residential development. In a study of the Izmir region in Turkey, Celik and Yankaya (2006) contended that their empirical results should convince decision-makers in developing countries that railway and transit investments will provide additional economic value beyond direct ticket revenues.

Debrezion et al. (2006) found a negative price effect associated with railway track proximity, probably due to higher levels of noise. Two railway station accessibility measures were used: the nearest and the most frequently chosen station in the post code area. The results indicate that railway station accessibility is a more complex concept than one might think; it sometimes involves competition between several accessible railway stations.

Studies of the regional enlargement of the Stockholm region in Sweden showed that the radius of the price-distance gradient increased as a result of improved rail accessibility. (Andersson and Andersson, forthcoming). On the other hand, Andersson et al. (2008) did not find any substantial and consistently significant effects of HSR accessibility on property values in the Tainan metropolitan area (south Taiwan).

Hedonic price theory is usually traced back to a paper by Rosen (1974). In that paper, Rosen uses a conventional utility-maximizing approach to derive implicit attribute prices for multi-attribute goods under conditions of perfect competition. The basic idea is that goods such as housing, which are differentiated rather than homogeneous, can be decomposed into homogeneous attributes, where each attribute has a unique implicit price in equilibrium. Perfect competition, however, rests on assumptions of perfect information and zero transaction costs, which are not normally approximated in markets for experience goods such as housing. Hedonic price models aim at disentangling such attributes of a good from one another for the purpose of estimating implicit prices. The normal assumption in hedonic price functions for housing is that the price or rent is a function of various attributes, typically divided into structural, neighbourhood, and accessibility attributes. Individual buyers or renters attempt to maximize their expected utility, subject to various constraints, such as their money and time budgets. Regression techniques make it possible to estimate the implicit price for each attribute. A linear function implies constant marginal implicit prices. In non-linear models, the price of an additional unit of an attribute depends on the quantity already supplied and in the most common specifications also on the quantity of other attributes.

Concerning our case study, a preliminary qualitative analysis has been carried out of the available data highlighting a correlation among property prices (houses and offices), time (reference year) and distance from the HS nearest station. Different typologies of houses, and offices have been considered (see Table 1).

Table 1 - Typologies of houses and offices

Houses	Pre 1919 Terraced House Inter war semi-detached house Post 1960 semi-detached house Post 1960 detached house Post 1960 flat in 3 (or more) storey block
Offices	Type 1 - Town centre location. Self contained suite over 1,000sq.m in office block erected in last 10 years. Limited car parking available. Type 2 - As Type 1 but suite size in range of 150sq.m-400sq.m Type 3 - Converted former house usually just off town centre. Good quality conversion of Georgian/Victorian or similar house of character. Self-contained suite in size range 50sq.m-150sq.m, with limited car parking

The data on property prices used for the analysis has been retrieved from different official sources, such as the Valuation Office Agency and the Land Registry, and covered a period of eight years (2001-2008). The research shows a correlation between the property price (of houses and offices), the year (linked to the opening of HS stations) and the distance from the nearest HS station, calculated as the average distance from the centre of the location that can be covered by a private vehicle. Data considered have been grouped into three classes as a function of the distance from the nearest HS station: less than 5miles, between 5 and 10miles, and more than 10 miles. The locations considered in the property values analysis are spread throughout the South East of England. From Figure 2, it can be noticed how property values for houses have increased after the opening of Sections 1 (2003) and 2 (2007) of the CTRL. In these years there is the highest increase of property values; the increase has been registered for houses of each band (less than 5miles, between 5 and 10 miles and more than 10 miles), but for properties located at a distance from the nearest HS station less than 5 miles, the increase is the highest.

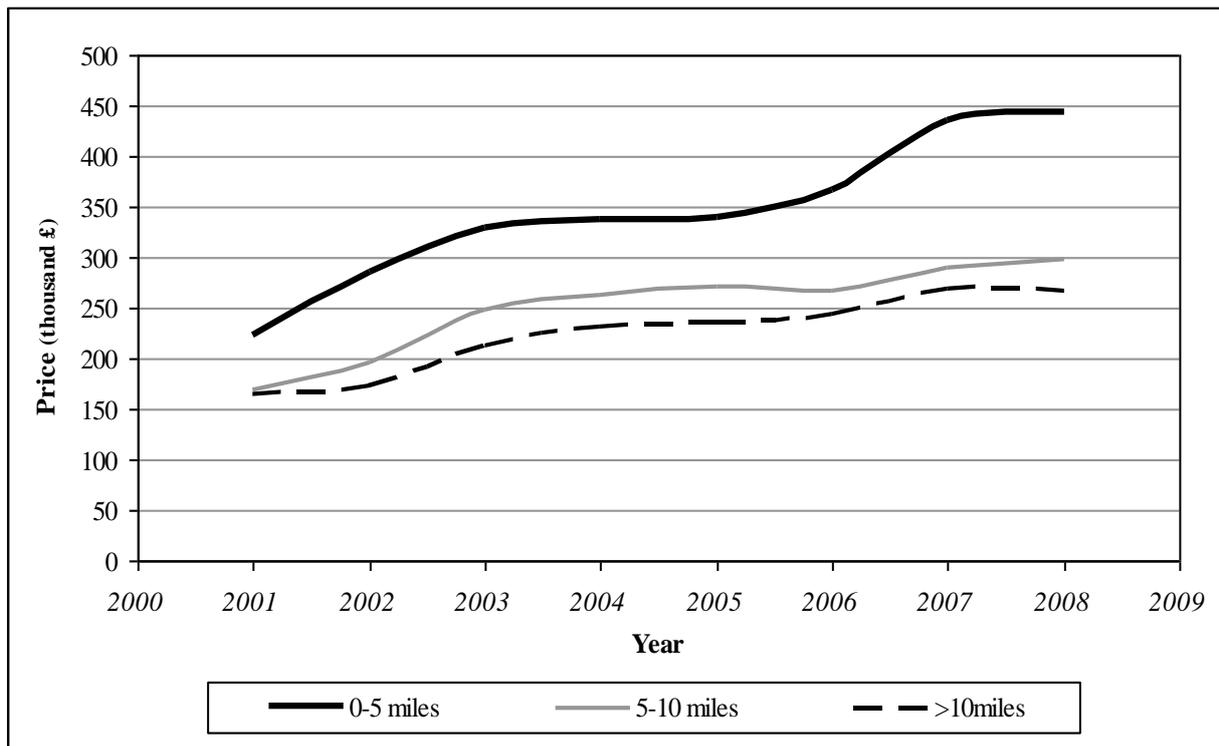


Figure 2 - Average housing prices: all types

The observed variation of rental prices in the years for offices (see Figure 3) is different from that of houses. In particular for offices the rental price seems to change in the years only for the buildings located at a distance less than 5 miles from the nearest HS station. Figure 3 shows that in 2007 (with the opening of Section 2 of the CTRL) there is a high increase of rental prices for the offices closer to the HS stations (first band).

Following a qualitative analysis which can be gathered from graphing property prices over time, regression techniques have been used to estimate the implicit price for each attribute. A linear function implies constant marginal implicit prices. In non-linear models, the price of an additional unit of an attribute depends on the quantity already supplied and in the most common specifications also on the quantity of other attributes (Andersson et al, 2008).

Non-linear models are generally to be preferred, since linear functions are unrealistic when applied to the typical housing market. The most popular functional forms are log-linear, semi-logarithmic, which are all theory-compatible and relatively simple. In this paper all these functional expressions have been considered. Box-Cox transformed forms have been considered as well. Box-Cox estimation is popular in hedonic price studies because data-specific transformations of functions can substitute for a priori specifications of the functional form when theory fails to suggest a specific form.

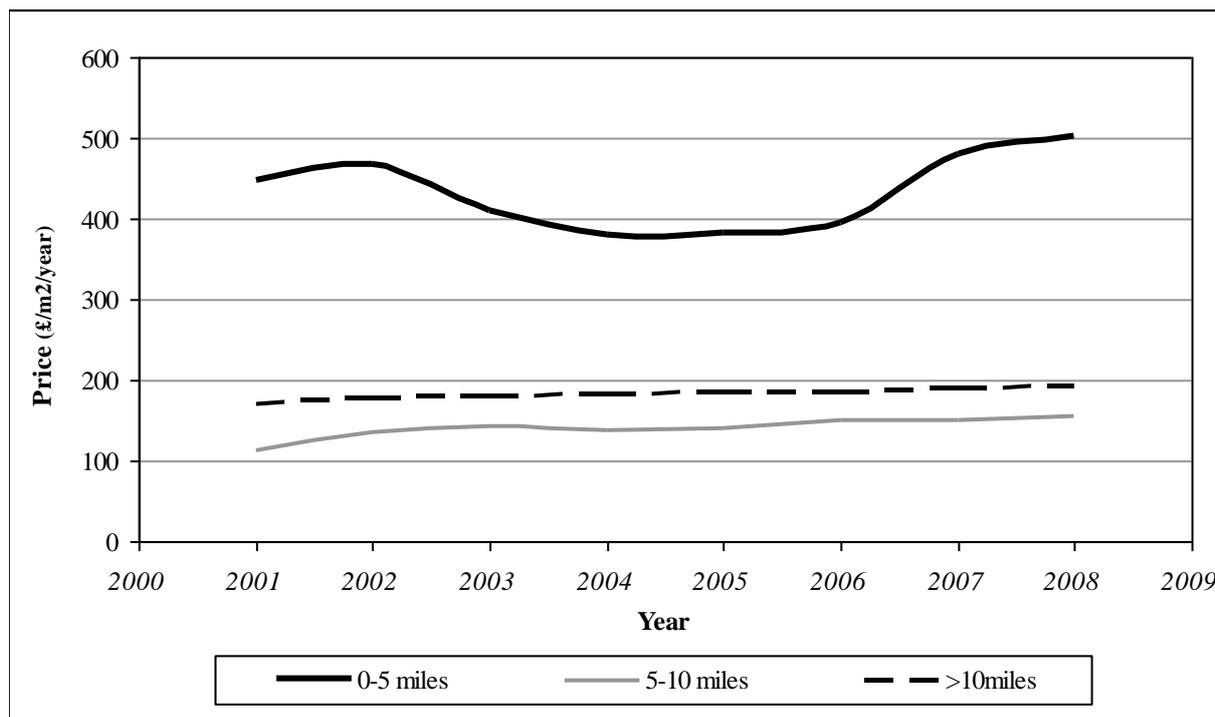


Figure 3 - Average office prices: all types.

Tukey (1957) says that the purposed of a transformation is to stabilise the error variance, to create a model with a symmetrically distributed error term and to find a more nearly linear model.

The most general and flexible form of the linear Box-Cox transformation is:

$$X_1^{\lambda_1} = \beta_1 + \beta_2 X_2^{\lambda_2} + \dots + \beta_i X_i^{\lambda_i} + \dots + \beta_k X_k^{\lambda_k} \quad \lambda_i = \lambda_1, \dots, \lambda_k \quad (1)$$

where

$$X_i^{\lambda_i} = (X_i^{\lambda_i} - 1) / \lambda_i \text{ for } \lambda_i \neq 0; \quad \ln X_i \text{ for } \lambda_i = 0$$

The linear Box-Cox transformation with a pre-specified right-hand side but with a transformed dependent variable, as well as the Box-Cox function with a uniform transformation parameter for all variables are, according Davison and McKinnon (1993), mainly concerned with obtaining residuals that are homoscedastic and symmetrical, while treating the functional form as being essentially given. By contrast, models in which independent variables are transformed separately imply that the functional form depends on the transformation parameter.

The independent variables considered here are in the following reported:

Year is the real estate observation year from 2001 to 2008, the variable assumes values ranging from 1 to 8.

Distance is the real distance from the nearest HS station, measured in miles.

InnerLondon is a dummy variable assuming value 1 if the real estate is within Inner London,

0 otherwise.

- St.Pancras* is a dummy variable assuming value 1 if the real estate is within the Borough of Camden where St Pancras station is placed, 0 otherwise.
- Dist_{<3}* is a dummy variable assuming value 1 if the real estate is within a distance from the nearest HS station less than 3 miles, 0 otherwise.
- Rail Fare* is the rail fare measured in pounds sterling.

The estimation of the price functions comprises eight different models, among them linear, log and semi-log models. Moreover Box-Cox specifications have been considered as well. In table 2 regression results for both houses and offices are reported. Only the best models in terms of goodness-of-fit are presented. Concerning houses, the best model specifications are:

Houses

$$\ln(P) = c + \beta_{year} Year + \beta_{Dist} Distance + \beta_{IL} InnerLondon + \beta_{St.P} St.Pancras + \beta_{RF} RailFare$$

$$P^{0,5} = c + \beta_{year} Year + \beta_{Dist} Distance + \beta_{IL} InnerLondon + \beta_{St.P} St.Pancras + \beta_{RF} RailFare$$

In both specifications, all the variables are significant and of the expected sign. Specifically the variable *Distance* is negative and significant meaning that the property price is affected by the distance to the nearest HS station. Location dummies have turned out to be significant in reproducing property price, in fact both *St.Pancras* and *InnerLondon* are positive and significant at the 5% level. The *Rail Fare* variable has been introduced to better explain how it affects travel volumes and therefore property prices. It is in fact negative and significant. The best model in terms of goodness-of-fit is the Box-Cox specification.

Concerning offices, the best model specifications are:

Offices

$$\ln(P) = c + \beta_{year} Year + \beta_{IL} InnerLondon + \beta_{St.P} St.Pancras + \beta_{Dist<3} Dist_{<3}$$

$$P^{0,5} = c + \beta_{year} Year + \beta_{IL} InnerLondon + \beta_{St.P} St.Pancras + \beta_{Dist<3} Dist_{<3}$$

In the case of offices, the dependent variable considered is the rental price (£/m²/year). Here again the semi-log and Box-Cox specifications have produced the best results. In general, the dummy variable *D_{<3}* has been introduced, which is significant and of the negative sign, confirming the importance of the real estate being within 3 miles from the nearest HS station. For offices the variables *Distance* and *Rail Fare* have not reported since in the estimation results they are not significant.

Location dummies (Inner London and St Pancras) are very significant in both model specifications. In particular, for offices, the coefficient values are much greater than for houses.

After evaluating the economic impacts in terms of property values changes for the whole area served by HS1, a detailed analysis has been carried out for the London Borough of Camden, where St. Pancras International Station is placed, focusing only on the property values for houses. The results obtained have been compared with the average values of London and with those of Southwark (where the Waterloo station is, which was initially the arrival node of HS trains in London). While the houses property prices in the borough of Camden between 2001 and 2004 follow the average trend of the whole city of London, between 2006 and 2008, there is a significant rise in the prices that might be linked to the impending opening of St. Pancras International Station. In fact there is an increase of 10% in Camden Borough in 2006, compared to the average increase of 6% in London. This difference is augmented in 2007, in relation to the opening of St. Pancras International Station, showing an increase of 20% in Camden, while there is a smaller increase - of 15% - in London. The same behaviour can be observed in 2008, when there is an increase of 7% in Camden while London does not show important variations. This latter fact is also due to the economic crisis, whose effects can be observed more intensively in the last months of 2008 and the first months of 2009, when there was a decrease in property prices.

Comparing 2008 with 2006 – the year before the opening of St. Pancras International Station – an increase of 28% in the private accommodation prices in Camden can be observed. This data can be compared with the increase of 15% which took place in London in the same period. This shows a net increase of 13% in the borough of Camden compared to the average increase registered in the city of London (see Figure 4).

Table 2 - Regression models estimation: HOUSES and OFFICES

Coefficient (t-statistic)	Houses		Offices	
	Semi-Log Model	Simple both-side Box-Cox Model	Semi-Log Model	Simple both-side Box-Cox model
C	5,683	0,054	4,728	0,492
β_{year}	0,071 (9,530)	-0,002 (-10,501)	0,023 (3,108)	-0,002 (-3,350)
β_{Dist}	-0,005 (-5,629)	0,0002 (6,168)		
β_{IL}	0,102 (2,346)	-0,002 (-1,821)	0,846 (14,838)	-0,053 (-14,008)
$\beta_{St.P}$	0,266 (7,873)	-0,009 (-8,584)	0,478 (12,008)	-0,034 (-12,676)
$\beta_{Dist<3}$			-0,254 (-3,839)	0,015 (3,425)
β_{RF}	-0,008 (-2,130)	0,0003 (2,896)		
N. obs.	248	248	208	208
R ²	0,555	0,593	0,788	0,786
R ² adj.	0,546	0,585	0,784	0,782

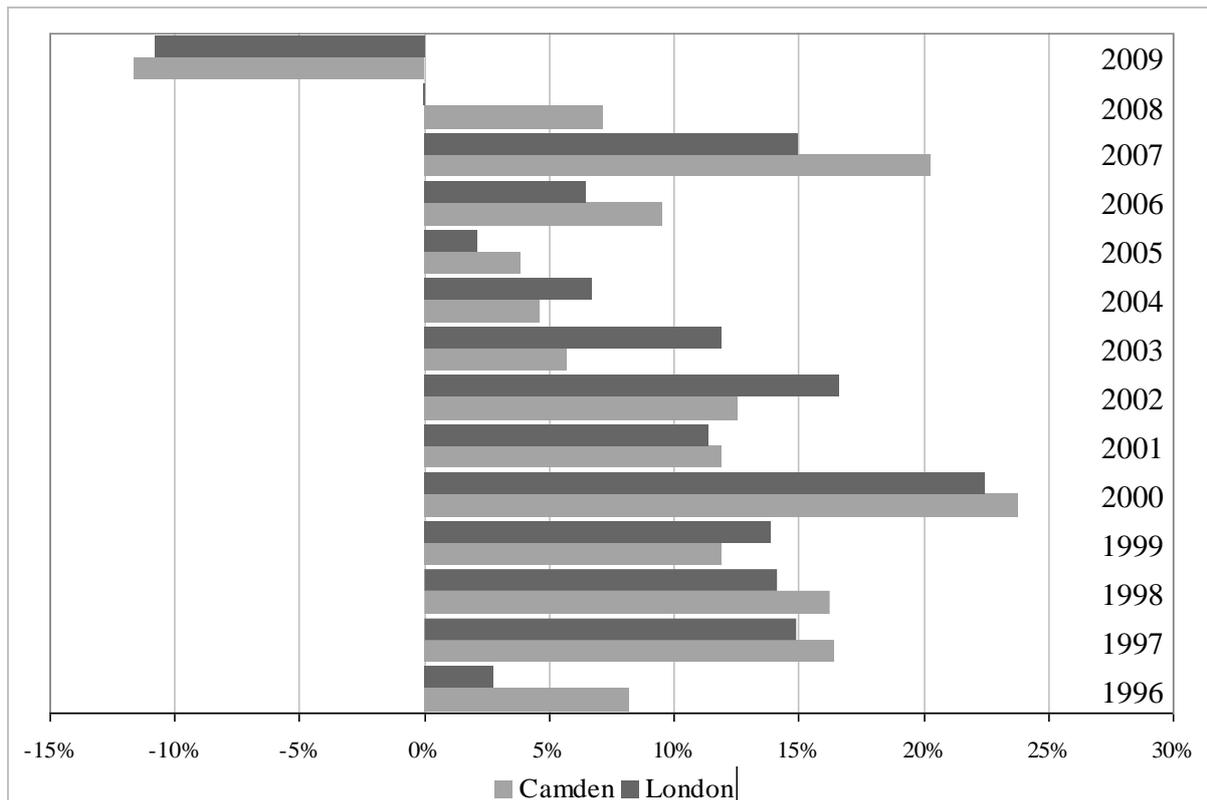


Figure 4 - House prices in Camden Borough and in London

4. THE CTRL IMPACTS ON ACTIVITY LOCATION

Travel by HS trains involves a lot of business related movement, by executives of both large and specialist businesses. It also includes some commuting, essentially into national capitals, over shorter distances and leisure travel (short breaks) over longer distances. Thus the focus is very much on the service sectors of the economy: business, public administration, leisure, commerce, and tourism. It follows that the economic activities which benefit from HS train service provision lie in these fields (Blum et al., 1997). Thus a positive effect will follow where higher speed rail is provided to a city growing its service sectors. But this can only happen if the HS rail network is designed in such a way that it affords convenient, ready access to the locations where the service economy is focussed: they want to be within easy reach of a station served by HS trains (Greengauge 21, 2006).

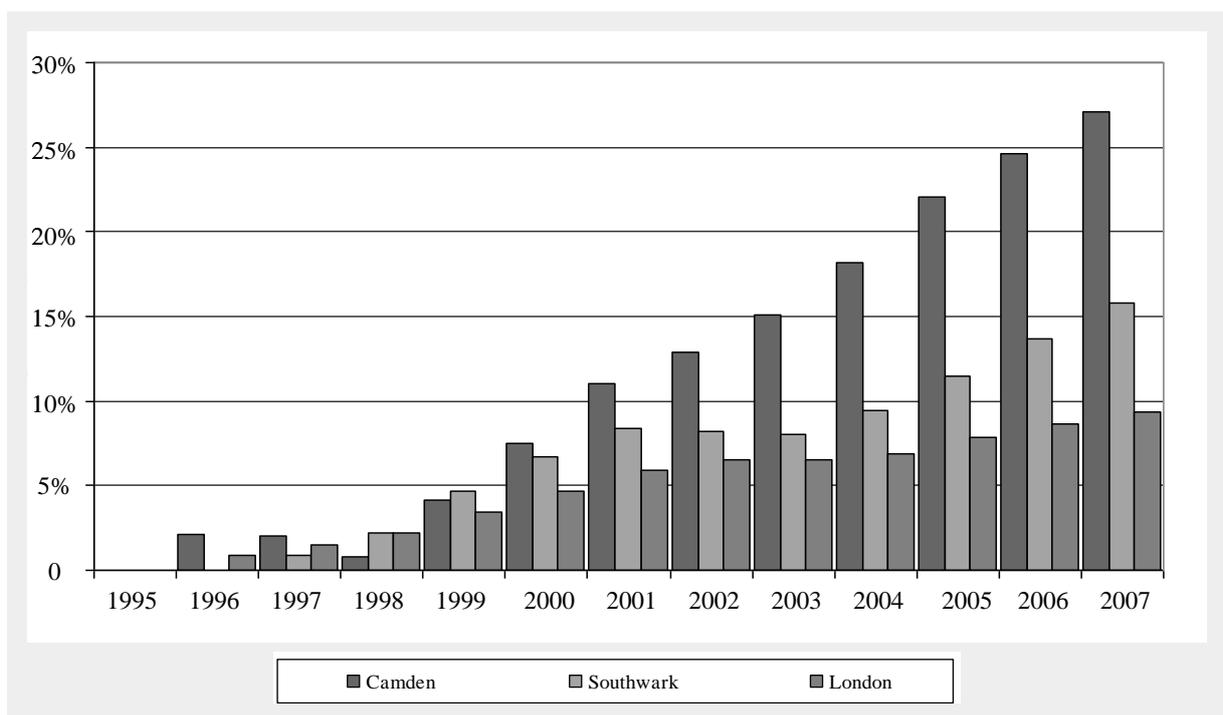
Land use impacts are related to land use and its quality. Examples of land use impacts are changes in land use type (e.g. from residential to commercial) and intensity, or more generally the relocation of housing and economic activities brought about by accessibility differentials. This category includes changes in the geographical structure of a region or in the urban quality of specific neighbourhoods. The analysis has considered the same areas previously analysed. In the borough of Camden there has been an increase in the number of residents higher than the average increase registered in London. Such outcome is an index

of a migration of residents towards the borough of Camden which has seen during the last years also due to on-going gentrification phenomenon.

In Camden district, where the HS station was opened at St. Pancras in 2007, there is a growing number of residents higher than the average growth in the city of London. This result indicates a migration of residents to the borough of Camden, which, in association to the implementation of the HS rail system, has been, and is still, the subject of a lot of redevelopment projects of an area degraded until few years ago .

The population of Camden in 2007 has increased by over 27% with respect to 1995, whilst the population of London has grown less than 10%. In the same years there has been an increase of 16% of population of Southwark (see Figure 5). Between 2004 and 2007 there has been an increase equal to 7.6% for Camden and to 5.8% for Southwark.

Concerning the change of the number of jobs, after the inauguration of the second section of HS1, there has been an increase of 4.2% in Camden (see Figure 6). The importance of the increase that has taken place in the borough of Camden between 2006 and 2007 is even more evident if compared to the overall change that occurred in that year in London. The number of employee jobs registered in London increased of 2.1%, representing almost half of the increase percentage that has taken place in the only district of Camden.

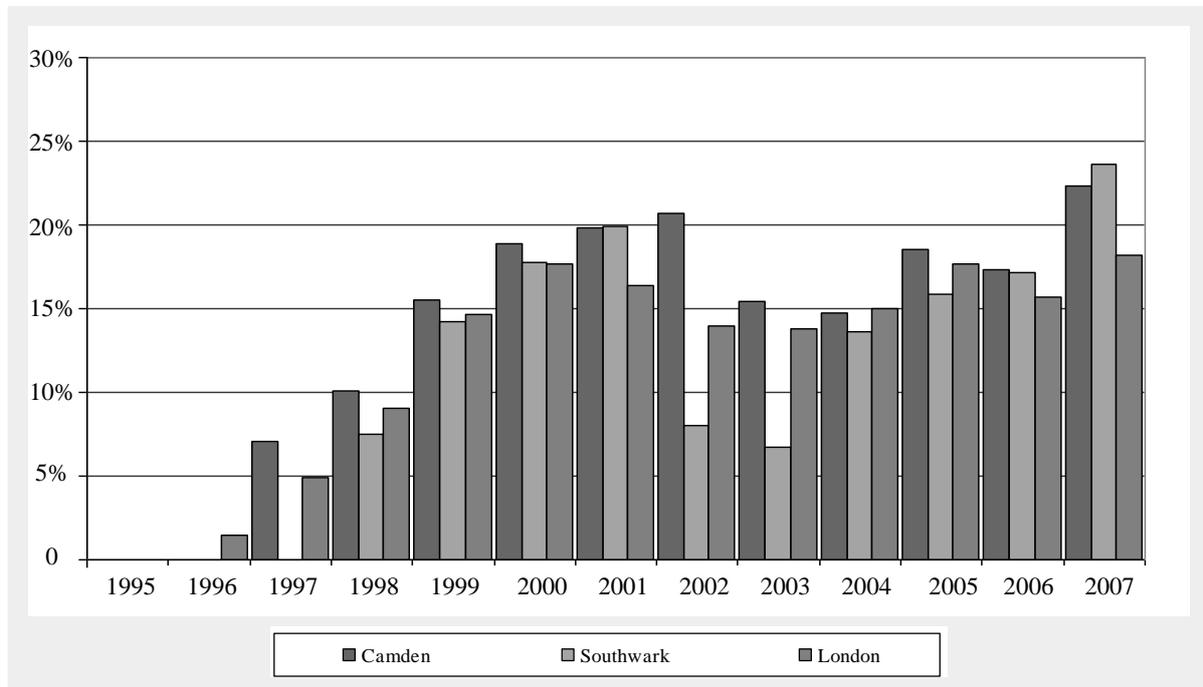


Source: Nomis – Official labour market statistics

Figure 5 - Change of the number of residents

The results obtained reveal considerable socioeconomic impacts in Camden Borough. Comparing these results with the results of previous studies concerning Ashford in Kent, a major difference can be observed in the impacts which affect smaller towns or bigger cities.

The impacts on property prices, employment and population growth which took place in 2007 in Camden Borough in London, were higher than those which took place in 1996 in Ashford (Kent) at the time of the opening of Ashford International Station (see also Preston and Wall, 2008).



Source: Nomis – Official labour market statistics

Figure 6 - Change of the number of jobs

5. CONCLUSIONS AND FURTHER PERSPECTIVES

It is clear that HS services can serve as a factor in the development of city economies, supporting city development plans and the regeneration of run-down areas. The main outcome of this research is that there is a relationship between property prices and distance to the nearest HS station.

HS rail can improve a location's attractiveness by its image effect: the presence of HS railway services makes a station appear modern and dynamic, and thus raises the status of this location. It follows that the value of nearby properties may rise. If rail offers a better transportation alternative to driving in terms of reduced commuting time or less tangible benefits such as a less stressful commute, then commuters should be willing to pay for these benefits by offering more for properties close to rail stations. Another factor that may cause higher property values in station areas is that neighbourhood commercial services, such as retail establishments, may be attracted to these areas. Though primarily meant to serve customers coming through the transit station, these additional services may also benefit nearby residents, regardless of whether or not they ride the train.

The Channel Tunnel Rail Link represents an example of this phenomenon. This paper has been able to find substantial and consistently significant effects of HSR accessibility on property prices and on residents and employee jobs location.

Especially for houses, the distance to the nearest HS station is a variable which may help explain property prices. For offices, close proximity to an HS station seems to have a negative impact but location variables (St Pancras and Inner London) are of paramount importance. Further research will consider the same analysis but concentrated in the Borough of Camden, where St Pancras International HS station is placed. This will be done to better analyse offices rental prices.

Appendix

Table A1 - Correlation matrix - HOUSES

Correlation Matrix - HOUSES						
	Price	Year	Distance	Inner London	St Pancras	Rail Fare
Price	1					
Year	0,35963	1				
Distance	-0,36013	3,6E-18	1			
InnerLondon	0,39839	-9E-19	-0,5944	1		
St.Pancras	0,34902	1,8E-18	-0,09049	0,265064	1	
Rail Fares	-0,16695	-0,36952	6,07E-18	2,01E-17	6,29E-18	1

Table A2 - Correlation matrix - OFFICES

Correlation Matrix - OFFICES					
	Price	Year	Inner London	St Pancras	Dist<3
Price	1				
Year	0,057152	1			
InnerLondon	0,775546	4,34435E-17	1		
St.Pancras	0,537256	-8,04509E-17	0,441641	1	
Dist<3	0,389259	0	0,7025	0,31025261	1

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