Intercity Fares Structure Review

Public Transport Advisory Services Assignment 3

Final Report for National Transport Authority

August 2011

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1 Introduction

1.1 National Transport Authority Requirements

1.1.1 Booz & Co. and MVA Consultancy were commissioned by the National Transport Authority (NTA) to conduct a review of the Intercity Fares Structure. The overarching objective of the review is to consider Iarnród Éireann's (IE) fares structure for Intercity journeys with a view to addressing the anomaly that the standard fare varies significantly by route, and when journeys use more than one route significant anomalies can occur (e.g. fare is greater than the sum of the parts).

1.2 Scope and Focus of the Review

1.2.1 This review focused on intercity fares, but also considered the interface with commuter fares at the boundaries between the two fares calculation areas (commuting fares are at a lower level than Intercity).

1.2.2 The focus of this review is the recommendation of a consistent fares structure for standard intercity fares that is based on distance and similar objective measures which is broadly neutral in terms of level of PSO payment, certainly in the short term.

1.3 Objectives of Revised Fare Structure

1.3.1 The outcome of the review will be the implementation of a simplified fare structure for standard fares that meets the following objectives:

- Consistent;
- Avoids anomalies;
- Meets market requirements; and
- Broadly neutral in terms of revenue.

1.3.2 The new fares structure also seeks to increase overall passenger numbers.

1.4 Approach

1.4.1 As common in other countries, a distance based fares system was considered.

1.4.2 It is important to get fares levels right for flows to/from Dublin which dominate the demand. However, most of the biggest anomalies occur on other flows, so these were also addressed. We considered all major flows to/from Dublin and both those involving transfer at Dublin (or elsewhere) and those which are on direct train services. We also considered some short distance flows where they are set under Intercity fares rules. We specifically looked at boundary issues with the commuting fares areas, but the commuter fare structures are themselves beyond the scope of this review.

1.4.3 To undertake this analysis we created a simple spreadsheet model that forecasted the effect of alternative fares structures in terms of demand and revenue, using an elasticity formula. The appropriate elasticity was derived using the Passenger Demand Forecasting Handbook of Britain's railways (PDFH), and experience in other countries; there is little evidence on rail fares elasticities specifically for Ireland.

1.4.4 Taking into account the views of stakeholders and the modelling, we have recommended alternatives for a more coherent fares structure for intercity standard fares. These recommendations take into account the effect on PSO, the extent to which there are winners and losers, the impact on demand for intercity rail travel, and whether there remain any anomalies (for example at the boundaries with the commuting areas).

1.5 Structure of Report

1.5.1 This report contains four other chapters as follows:

Chapter Two

1.5.2 This chapter reviews customer feedback provided by IE. It also discusses our consultation findings where Regional and Local Authorities and Rail Users Ireland were consulted on IE's current fares structure.

Chapter Three

1.5.3 This chapter presents the alternative fares scenarios to be tested using a demand elasticities spreadsheet model.

Chapter Four

1.5.4 This chapter presents the results of the scenario testing and analyses these results to determine a preferred structure.

Chapter Five

1.5.5 Finally, this chapter provides a summary of the recommendations and discusses next steps.

2 Customer & Consultation Feedback

2.1 Customer Feedback

2.1.1 Performance data and customer feedback is regularly collated by Irish Rail using a variety of data collection methods to ensure adherence to their performance obligations. These include customer surveys, focus groups, and direct meetings between customers and station management.

2.1.2 Appendix A provides a summary of the information provided by Irish Rail with regards to fares. The key points are:

- 53% of rail passengers are aware that discounted train fares are available if booked online via www.irishrail.ie yet the majority of passengers continue to buy their ticket at the station; however, a growth in online purchasing via the Irish Rail website was recorded in recent years;
- 'Value for money' for customers has increased in importance since 2008;
- Cost of rail travel is perceived to offer no great cost advantage over car travel. Many felt that rail ticket prices are still more than they were willing to pay;
- Lapsed users feel that a temporary fare reduction is needed to persuade people to come back to rail on a trial basis;
- Non-users agree that if rail travel offered a cost advantage over car travel, they would be more interested in trying it; and
- Most advise a short-term price cut to stimulate trial and remind/teach consumers of the benefits of rail travel.

2.2 Consultation Feedback

2.2.1 At the outset of the review an extensive stakeholder consultation was undertaken to better understand the requirements of the fares review. This process forms an important part of the review and has a key role to play in developing a detailed understanding of the current fares issues and the consideration of potential solutions.

2.2.2 During Spring 2011 a number of Regional and Local Authorities were contacted, as were Rail Users Ireland. Appendix B summarises the written responses received. The key points taken from the consultation process are:

Regional and Local Authorities

- A number of Regional and Local Authorities noted that the absence of integrated ticketing between bus and rail presents a missed opportunity to maximise the efficiency of public transport;
- Regional and Local Authorities also noted that the economic downturn has contributed to declining rail passenger numbers as people seek an alternative and more cost effective means of travel; and
- The Western Regional Authority commented that the key determinants of rail passenger usage are price, frequency, reliability and on-going connections in Dublin – bus operators are attracting customers on these key determinants.

Rail Users Ireland

- Fare anomalies across the network are noted including:
  - Fares for short intercity journeys can be greater than fares charged for similar distances on suburban rail in Dublin and Cork;
  - There is a large jump in fares when crossing between the commuter and suburban boundary;
  - Passengers travelling from two stations quite close to each other could end up paying the same fare for a given destination or could end up paying very different fares; and
  - Passengers can sometimes be better off purchasing several tickets where the station pair is not on the same route; however, this combination varies depending on time of day and also day of the week.

Implication for Fares

In recent years, value for money is becoming even more important to rail passengers (both existing and potential), almost certainly linked to the recession.

Most consider rail fares too high especially when compared to bus fares for the same journey or even car travel.

Rail fare anomalies exist which can result in unfair ticket prices for some journeys and was noted as a concern.

3 Scenario Testing

3.1 Scenario Testing

3.1.1 A spreadsheet model was set up to assess how different fares scenarios meet the objectives outlined in Chapter One and in addition, their impact on:

- The occurrence of large changes (positive or negative; winners and losers); and
- Overall demand and revenue.

Sources of Information Used in the Assessment

3.1.2 The Iarnród Éireann (IÉ) data on demand and revenue by fare type was analysed, and the current fares structure with its strengths and weaknesses reviewed. The analysis is based on information derived from the following sources:

- Iarnród Éireann 2010 Fare Book ("What's the Fare?") – effective from 1st January 2010 (provided by the NTA);
- 2010 Annual Ticket Sales, Revenue and Trip information provided by Iarnród Éireann for selected Origin – Destination (OD) pairs; and
- Iarnród Éireann website.

3.2 Basis for Scenarios

Types of fare

3.2.1 The types of fares should be few and comprise:

- Single;
- Return; and
- Web based advance purchase fares (not considered in this review), except as completing the overall fares structure.

3.2.2 The return fare should be less than twice the single (at least in many cases) as the rail market position is stronger for single trips, with car travel being not possible (at least as a driver). The current distinction between one day, five day and monthly returns increases the complexity of the ticket and fares structure, and, being in part a result of historic needs, is not based on current differential elasticities.

3.2.3 One type of open return valid for a specified period (e.g. 5-day or 7-day or 14-day) was considered with the possible addition of day returns.

Fares by geographical flow

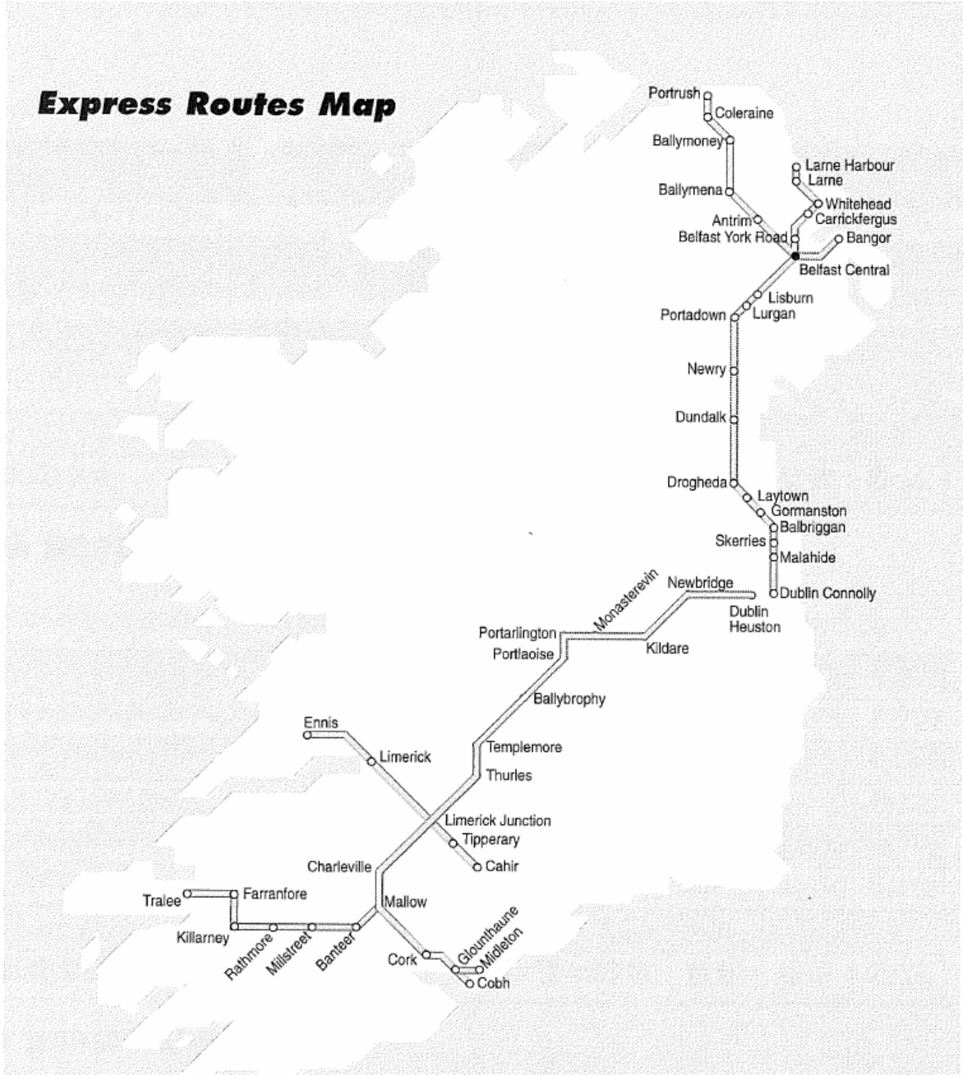
3.2.4 Fares should be linked to distance travelled calculated on the basis of rail distance. This would satisfy the objective to maintain a simple fare structure. Whilst a crow-fly or road distance might be better for competitive reasons, using crow-fly distance will likely result in anomalies within the fares structure whereby it is less expensive to travel further by rail due to geographic route constraints.

3.2.5 The fare might be solely proportional to distance or a taper (in some form) might be introduced with the rate per kilometre decreasing by distance travelled. The former scenario was tested.

Route Categorisation

3.2.6 At present, the fare structure varies by route, and whilst the routes are broadly categorised by IE as express and economy as shown in Figure 3.1, the fare level as set out on a route by route basis results in a wide variation in fare as shown in Figure 3.2. In broad terms, the variation in fare reflects the level of service provided on each route, though the precise basis for evaluating the level of service is not set out by Iarnród Éireann at present.

Figure 3.1 Current Express and Economy Route Maps



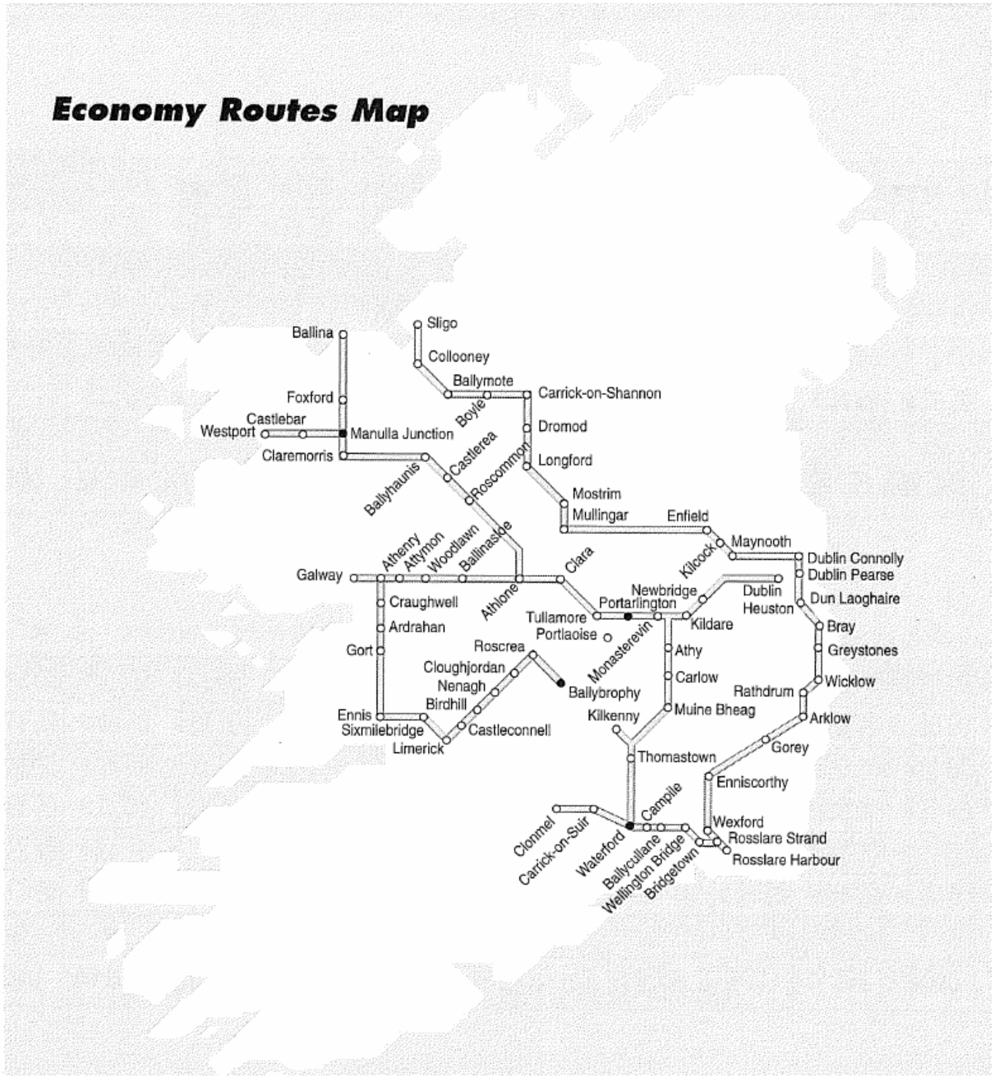
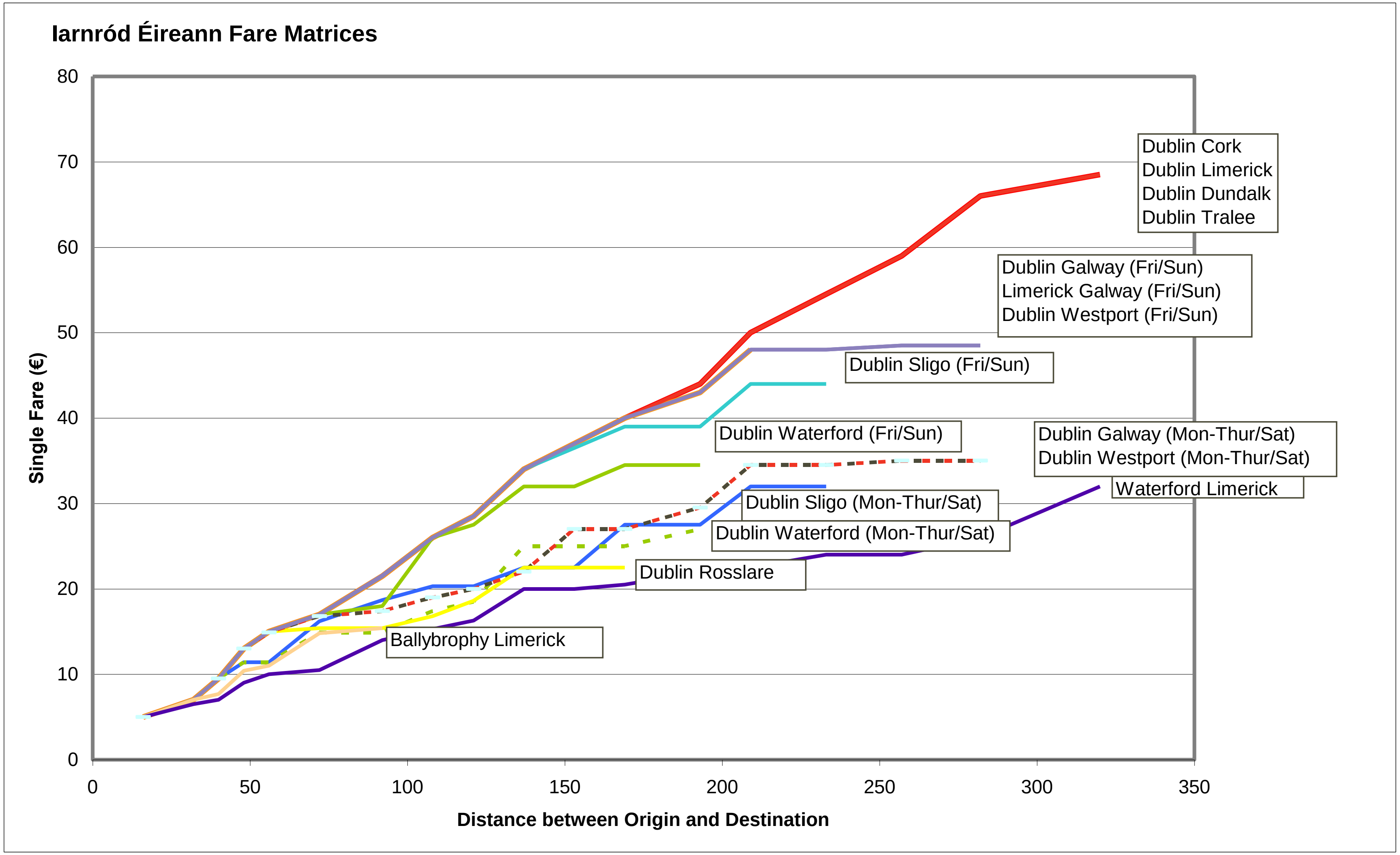


Figure 3.2 Current Single Fare Matrices

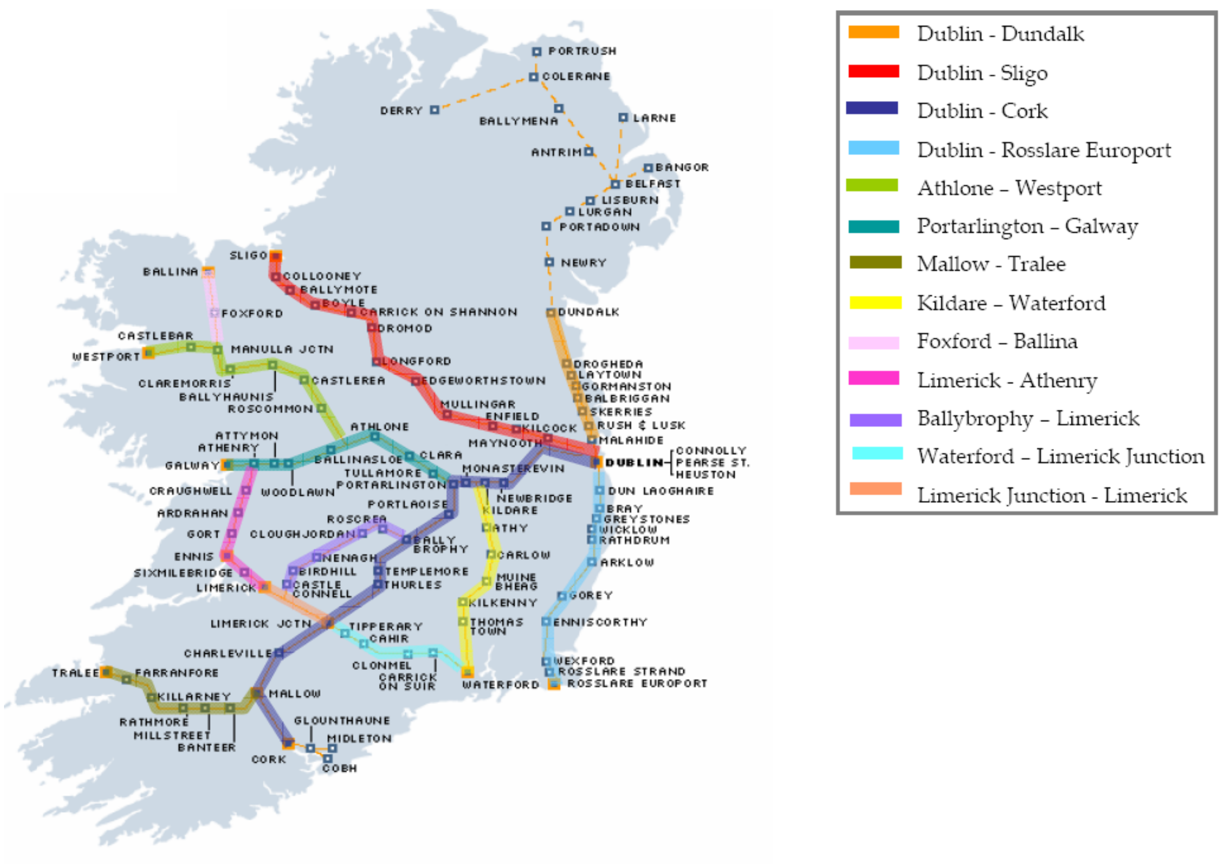


3.2.7 For some scenarios, in which a differentiation in fare to reflect the level of service offered continues to be applied, consideration was given to simplifying the fare structure. In this situation, a three tiered route categorisation was applied comprising Express, Economy 1 and Economy 2 routes by taking account of quality of rail service measured by:

- Service frequency;
- Average journey speed; and
- Possible competition (comparative speed by road (car/bus)).

3.2.8 It is important that the calculation of this is done in a way that does not introduce anomalies as exist at present along shared sections. Currently, in some instances, it is less expensive to travel further on particular routes than on shared sections (e.g. it is less expensive to travel from Dublin to Athy than Kildare). To avoid this anomaly in future, the network could be divided into sections with the appropriate categorisation for each section. Through an examination of the existing network characteristics and route operation, the network was divided into thirteen sections shown in Figure 3.3.

Figure 3.3 Segmentation of Rail Network



3.2.9 The level of service along each segment of the rail network is rated from Economy 2 to Express based on a five point scale and cumulative score as described in Tables 3.1 and 3.2.

Table 3.1 Scoring Table

Score	Frequency (per day)	Average Journey Speed (kph)	Comparative Speed (kph)
	Rail	Rail	Rail v Road
1	<4	< 60 kph	Much Slower (> 10kph slower)
2	<6	< 70 kph	Slower (5kph to 10kph slower)
3	<8	< 80 kph	Same (<5kph difference)
4	<10	< 90 kph	Faster (5kph to 10kph faster)
5	>= 10	>= 90 kph	Much Faster (> 10kph faster)

Table 3.2 Rating against cumulative score

		Economy 2				Economy 1				Express				
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15

Categorisation of Network Sections

3.2.10 Each section of the network was evaluated against the criteria set out in Table 3.1 and the results are presented in Table 3.3 and Figure 3.4.

3.2.11 These categorisations were used to test the scenarios. The calculation of fare for particular journeys is also dependent on the fare structure and is explained for each scenario in the next section.

Boundary with Commuter Zones

3.2.12 An assessment was made of the performance of the fare structure for journeys in and around the commuter zone boundaries. For some sections, such as Dublin - Dundalk, there is significant commuter demand and the commuter fare zones extend along significant portions of the line. A sense check was undertaken to examine the fares structure at these boundaries to ensure consistency. There may be a need to categorise sections with strong commuter demand on a case by case basis to provide a suitable transition from commuter to intercity fares.

Table 3.3 Evaluation of Network Segments

	Frequency (per day)	Score	Average Journey Speed (kph)	Score	Comparative Speed Difference (kph)	Score	Cumulative Score	Category
Dublin - Dundalk	14	5	83	4	-3kph	3	12	Express
Dublin - Sligo	8	4	73	3	0kph	3	10	Economy 1
Dublin - Cork	13	5	96	5	+5kph	4	14	Express
Dublin – Wexford/Rosslare Europort	5	2	59	1	-14kph	1	4	Economy 2
Athlone – Westport	4	2	77	3	+9kph	4	9	Economy 1
Portarlington – Galway	8	4	76	3	-3kph	3	10	Economy 1
Mallow - Tralee	7	3	65	2	-4kph	3	8	Economy 1
Kildare – Waterford	6	3	73	3	-11kph	1	7	Economy 1
Foxford – Ballina	6	3	74	3	+5kph	4	10	Economy 1
Limerick - Athenry	6	3	56	1	-14kph	1	5	Economy 2
Ballybrophy – Limerick	2	1	48	1	-37kph	1	3	Economy 2
Waterford – Limerick Junction	3	1	57	1	-5kph	2	4	Economy 2
Limerick Junction - Limerick	15	5	78	3	+13kph	5	13	Express

Figure 3.4 Categorisation of Network Segments

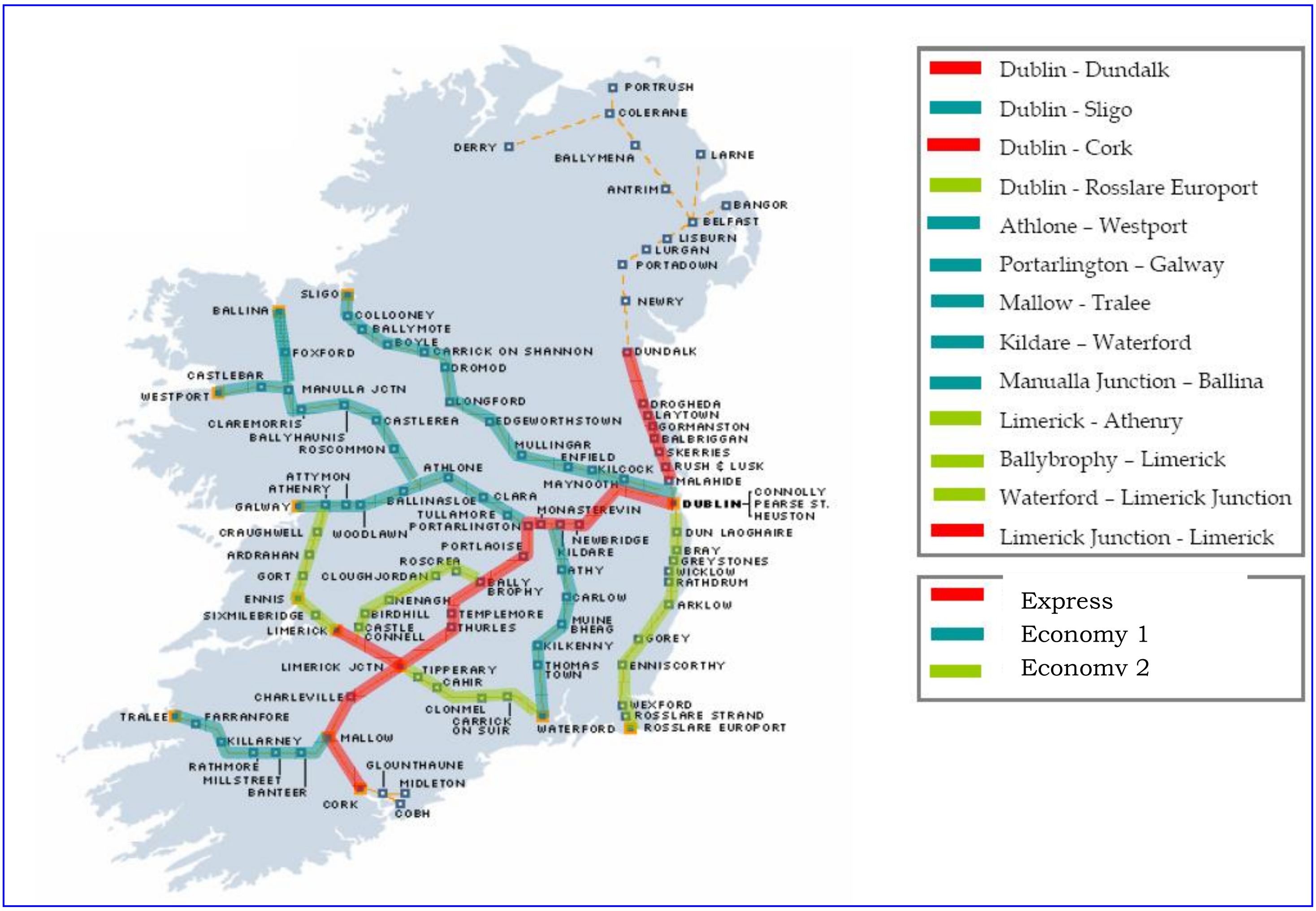
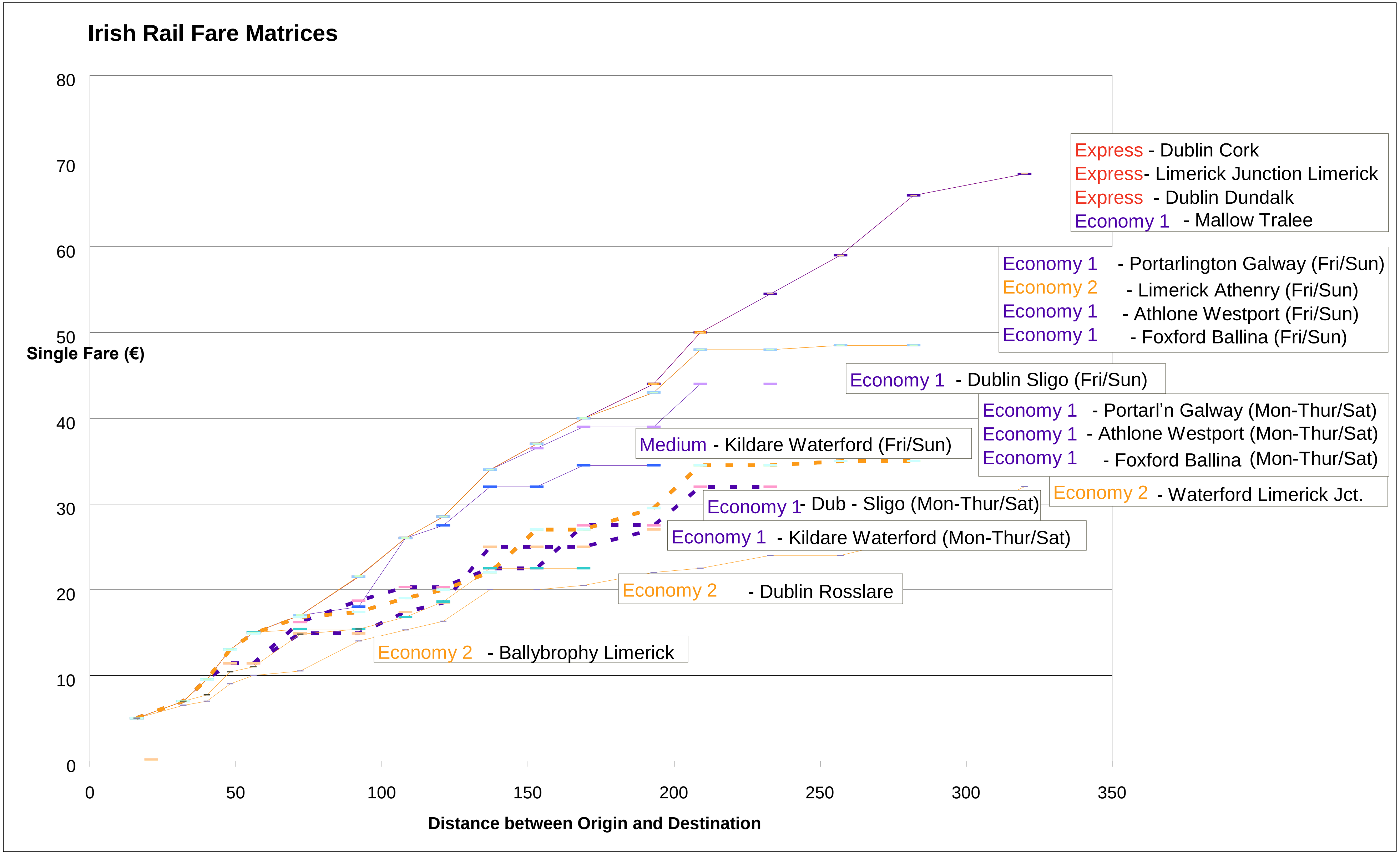


Figure 3.5 Proposed Categorisation of Network Segments within Current Single Fare Structure



3.3 Scenarios for fares types

3.3.1 As a result of the previous discussion, the following scenarios for fare types were assessed:

Scenario F1 (single and open return fares):

- Single Fares
- Open Return Fares at a discount on 2 single journeys; the discount would be fixed percentage (30%, for example)
- Web based Advance Purchase fares.

Scenario F2 (single only):

- Single Fares
- Web based Advance Purchase fares.

Scenario F3 (single only with peak pricing):

- Single Fares valid anytime
- Single Fares valid off-peak at 30% discount; off-peak would be defined by route/flow, but might be day of week or exclude certain trains (e.g. exclude two trains per direction per route); any flow which used a peak train even for part of the journey would need to be at the peak fare
- Web based Advance Purchase fares.

Scenario F4 (single, open and day return fares):

- Single Fares
- Open Return Fares at a discount on 2 single journeys; the discount would be fixed percentage (30%, for example)
- Day return fares at a discount on 2 single journeys; the discount would be greater than that for Open Return Fares; for example, the discount would be fixed percentage (40%)
- Web based Advance Purchase fares.

3.3.2 In the case of Scenario F2 and F3, no return fare were provided for within the structure and the fare for return trips were calculated on the basis of the equivalent two single journeys.

3.4 Scenarios for Routes

3.4.1 The following scenarios for routes were assessed:

Scenario R1:

- Fare per km with segments categorised as Express/ Economy 1/ Economy 2 (discount of 15% for Economy 1, 30% for Economy 2 for example).

3.4.2 If a journey involves travel along a number of sections, the fare was calculated on the basis of the sum of the product of the distance travelled on each section and the fare per kilometre for each section. For example, the fare from Dublin to Killarney was calculated as follows:

Dublin Killarney Fare = (Dublin to Mallow distance × Dublin Cork fare per km) + (Mallow to Killarney distance × Mallow Tralee fare per km)

Scenario R2:

- Fare per km with routes categorised as Express/ Economy 1/ Economy 2 (discount of 15% for Economy 1, 30% for Economy 2)
- Additional fixed element for joining network (not varying by route)

3.4.3 Example of this is: fare = €3 + €0.2 * km. If a journey involves travel along a number of segments, the fare was calculated on a similar basis as for Scenario R1, but with the fixed element applied once. Using the Dublin to Killarney example again, the fare was calculated as follows:

Dublin Killarney Fare = Fixed element
+ (Dublin to Mallow distance × Dublin Cork fare per km)
+ (Mallow to Killarney distance × Mallow Tralee fare per km)

Scenario R3

- Fare per km

3.4.4 In this scenario, no categorisation was utilised and a fixed fare per km was applied across the entire network for all journeys.

Scenario R4:

- A modification of Scenario R2 (or R3) for journeys involving two or more routes – in cases where the overall rail service is poor, even though it uses a high quality (Express) route for much of the journey, there could be a rate per km which was very low (or even zero) for use as an add-on to the fare on the high quality route; Nenagh connecting to Dublin at Ballybrophy on the Cork line might be a good example.

3.4.5 Scenario R4 was only tested once decisions on other route scenarios were made.

Combined scenarios

3.4.6 In theory, each of the route scenarios could be combined with each of the fares scenarios. However, the choices between the route scenarios are fairly independent of those between fares scenarios.

3.4.7 Therefore each of the route scenarios was tested with Scenario F1 and the preferred route scenario was selected. Following on from this, each of the fares scenarios was tested with this selected route scenario.

3.4.8 Variants with different discount levels were tested at each stage.

3.5 Elasticity of Demand

3.5.1 In order to evaluate the alternative fares strategies, it is necessary to understand how they will affect demand and hence revenue. This is usually done using elasticities.

3.5.2 Set out below is the evidence for fares elasticities using:

- The Passenger Demand Forecasting Handbook (PDFH) version 5 of Britain's railways; and
- Sources from other countries.

PDFH evidence

3.5.3 PDFH provides evidence for various types of British flows. The most comparable sector to Intercity Irish flows is Inter Urban > 20 miles. Elasticities for these flows are provided in PDFH Table B3.4. Excluding season tickets, the elasticity is -1.0.

3.5.4 However, PDFH also states that elasticities depend on the fare level – lower fares lead to lower elasticities with a sensitivity of 0.6 (i.e. 1% lower fare means the elasticity is 0.6% lower).

3.5.5 Table B3.6 gives the average British fare for these flows as 28.09 p/mile (full fare) and 13.82 p/mile (reduced fare) in 2007 prices. Conversion factors to 2010 levels (RPI = 1.0822), km (0.625), € (1.14286) give overall conversion factor of 0.773. Hence the British fare levels average 0.2171 €/km (full fare) and 0.1068 €/km (reduced fare) in 2010 prices.

3.5.6 The Irish fares are approximately 20% lower than the British fares, so we would expect the elasticity to be approximately - 0.87 (= - 0.8^0.6).

Other evidence

3.5.7 MVA has worked extensively and has knowledge of (unpublished) fares elasticities used in France. These are -0.84 for leisure (i.e. non-business or commuting) travel and -0.39 for business. At IE's market of 22% business, 78% other (slide 5 of 2009 Customer Satisfaction Monitor), this averages at -0.74. It is thought that French rail fares are typical of IE's prices and no further adjustment is needed.

Recommended Elasticity

3.5.8 On the basis of the above, an average elasticity of -0.8 was used within the assessment.

Sensitivity Test

3.5.9 Irish Rail expressed a concern that, given the current recession, reduced fares may not succeed in generating demand in the expected manner. To reflect this concern, worst case sensitivity testing was undertaken for the emerging preferred scenario where passenger numbers remain constant despite fare changes.

3.6 Criteria for Selection

3.6.1 The objective is to create a fares structure:

- which is simple and avoids anomalies
- has broadly the same average fare as the current structure
- although there will have to be winners and losers, minimises the scale of these
- (less importantly) increases passenger demand.

3.6.2 The first was inherent in all of the fares structure tested.

3.6.3 The second of these was achieved through adjusting fares levels and discounts to provide a precise match to existing fare levels on average.

3.6.4 The third was evaluated by examining both the average percentage change in fares and its standard deviation.

3.6.5 Finally, the overall change in demand was estimated using the fares elasticity.

4 Analysis and Appraisal

4.1 Introduction

4.1.1 As detailed in the previous Chapter, each of the route scenarios was tested with Scenario F1 and the preferred route scenario was selected. Following on from this, each of the fares scenarios was tested using the selected route scenario. This Chapter details the results of these model runs.

4.2 Preferred Scenario for Routes using Scenario F1

4.2.1 Fares Scenario F1 was assessed using the four Scenarios for Routes (R1-R4). Scenario F1 considers single and open return fares. The routes scenarios consider:

- R1: fare per km with segments categorised as Express/Economy 1/Economy 2;
- R2: same as R1 with an additional fixed element for joining the network;
- R3: fare per km; and
- R4: modification of R2 (or R3) for journeys involving two or more routes.

4.2.2 The results of this analysis are shown in Table 4.1 below. All route options produce very similar journeys and revenue as planned, with the effect of fares changes being modest.

Table 4.1 Comparison of F1 R Scenarios

	Base Demand	F1R1 Base Demand	F1R1	F1R2 Base Demand	F1R2	F1R3 Base Demand	F1R3	F1R4 Base Demand	F1R4
Single Tickets	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Ave Single Fare	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Single Ticket Value	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Return Tickets	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Ave Return Fare	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Return Ticket Value	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Total Tickets	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Total Ticket Value	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

4.2.3 The change in fares is further demonstrated in Table 4.2. The percentage weighted average and weighted standard deviation of the fares changes for singles and returns for each F1R scenario are shown; as there are many more return tickets sold, it is the values for these that are more important.

4.2.4 It can be seen that F1R3 performs badly on most measures – giving high average percentage changes, and in the case of return tickets also a large standard deviation. This demonstrates that to avoid major changes in fares, it is necessary to include some form of route categorisation. F1R2 and F1R4 are very close, as would be expected as the only differences are for trip options that are little used. Our judgement based on Table 4.2 is that F1R2 (or F1R4) is preferred on the basis that the very high average percentage change in single fares is avoided, and the standard deviations of the fares differences are smaller.

Table 4.2 Change in Fares

	F1R1	F1R2	F1R3	F1R4
Weighted Average % Change Singles	-29.26%	-18.49%	-37.31%	-18.50%
Weighted Average % Change return	5.90%	9.88%	19.95%	9.87%
Standard Deviation % Change Singles	13.22%	7.56%	9.01%	7.58%
Standard Deviation % Change return	19.92%	18.43%	24.59%	18.43%

Price Analysis

4.2.5 A comparison of ticket price per route is shown in Appendix C. The key points for each of the following routes are:

- **Dublin – Cork**: Both single and return fares are lower than existing for each scenario tested. In particular, F1R3 Single is much lower than the existing ticket price for this route. The most similar to existing is F1R2/4;
- **Dublin – Galway**: In general, scenario ticket prices are in line with the existing price, except for the first four stops (Sallins – Portarlington), where the existing price is higher. F1R3 is considerably lower than the existing for single tickets; however this scenario is higher for most of the return tickets. The most similar to existing is F1R2/4;
- **Dublin – Limerick**: The existing ticket price for both single and return journeys is higher than the scenarios tested. The greatest difference is for the single journey between Dublin and Limerick where the existing ticket price is nearly twice the price for scenario F1R3. The most similar to existing is F1R2/R4;
- **Dublin – Westport**: In general, the existing ticket prices are greater for the shorter journeys (closest to Dublin) whereas they are lower for longer journeys. This is

particularly evident in return ticket prices, where the journey between Dublin and Westport would be about €15-20 more than the current return ticket price. The most similar to existing is F1R2/4;

- **Dublin – Waterford**: Single ticket prices are broadly inline with existing. For return journeys, the existing ticket prices are much lower than the scenarios tested, especially for longer journeys (except the journey to Kilkenny). The most similar to existing is F1R1;
- **Dublin – Rosslare**: For the single journeys the existing price is higher, expect for travelling past Wexford. For return journeys, the ticket prices are very similar except for F1R3 which is a lot higher than the existing. The most similar to existing is F1R1;
- **Dublin – Sligo**: Ticket prices are very similar for single journeys. Return ticket prices are also similar up to Longford. However after this point existing ticket prices are lower than all scenarios tested. The most similar to existing is F1R1/2/4; and
- **Dublin – Dundalk**: The existing single ticket price is higher than all scenarios tested. For return journeys, the existing ticket price is also higher except for the shortest journey. For the full journey between Dublin and Dundalk the return ticket price is very similar for existing and all scenarios tested. The most similar to existing is F1R3.

4.2.6 Graphs showing the results of the price analysis are shown Appendix C.

Implication for Fares

When considering the scenarios on a route by route basis, the preferred scenario varies depending on which route is taken. This demonstrates the importance of having some form of route categorisation.

F1R2 and F1R4 are very similar scenarios and are preferred to F1R1 as they avoid some of the largest differences :

- *F1R2: Single and open return fares with fare per km + additional fixed fare*
- *F1R4: Single and open return fares with fare per km + additional fixed fare modified for journeys including two or more routes*

Because these scenarios are so similar only one will be assessed further. F1R2 is the chosen scenario to be brought forward for further sub-option testing:

Sub-Options Testing

4.2.7 Based on the above results, F1R2 is brought forward for further sub-options testing. The following sub-option (or variant) tests were undertaken: V1 – V6, where an Economy 1 or Economy 2 discount level was applied. The discounts applied are as follows:

- V1: n 15%, Economy 2 30%;
- V2: Economy 1 20%, Economy 2 35%;
- V3: Economy 1 25%, Economy 2 35%;
- V4: Economy 1 30%, Economy 2 35%;
- V5: Economy 1 25%, Economy 2 30%; and
- V6: Economy 1 30%, Economy 2 30%.

4.2.8 At this stage, it is important to note that the majority of tickets sold are return tickets, approximately 85%. This is thought to be because of the current pricing structure, where return tickets cost little more than single tickets. Therefore, even though single tickets are considered, the focus needs to be more on return tickets.

4.2.9 The results of the F1R2 sub-option tests are shown in Table 4.3 and Table 4.4. Table 4.3 shows the most tickets are availed of in F1R2 V4 (1.069m compared to 1.051m in the base).

4.2.10 Table 4.4 shows that the weighted average change for return tickets is lowest for V4, at 4.69%, closely followed by V6 (4.89%), compared to 10.15% for V1. The Standard deviation change for return tickets is also lowest for V4 at 15.68% closely followed by V6 at 15.87%. Again, V1 gives the highest standard deviation change.

4.2.11 The total ticket value is very similar for V4 and V6 and these are the closest to the base. V1 and V2 generate more revenue but with fewer tickets than V4 and V6. The objective is to simplify the fares structure, but keeping as close to the existing revenue as possible, preferably increasing the numbers travelling and therefore V4 or V6 are chosen as the most appropriate.

Table 4.3 Comparison of F1R2 V Scenarios

	Base	F1R2 V1	F1R2 V2	F1R2 V3	F1R2 V4	F1R2 V5	F1R2 V6
Single Tickets	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Single Ticket Value	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Return Tickets	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Return Ticket Value	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Total Tickets	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Total Ticket Value	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

Table 4.4 F1 R2 Preferred Sub-Option Tests

	F1R2 V1	F1R2 V2	F1R2 V3	F1R2 V4	F1R2 V5	F1R2 V6
Weighted Average % Change Singles	-18.31%	-18.92%	-19.52%	-20.15%	-19.48%	-20.11%
Weighted Average % Change return	10.15%	8.26%	6.50%	4.69%	6.70%	4.89%
Standard Deviation % Change Singles	7.58%	7.28%	7.23%	7.49%	7.19%	7.46%
Standard Deviation % Change return	18.47%	17.23%	16.31%	15.68%	16.46%	15.87%

Implication for Fares

Choosing F1R2, V4 is the closest to the base scenario. However, V4 and V6 are very similar. Because V6 is simpler (30% discount for both Economy 1 and Economy 2) this will be the preferred option.

4.3 Preferred Scenario for Fares using R2 V6

4.3.1 Using R2 V6, the Scenarios for Fares (F1-F4) were assessed.

4.3.2 The base total ticket value is approximately [redacted]. Comparing Base Demand Scenarios, F4R2 V6 has the nearest to existing total ticket value, although it is lower (€[redacted]m compared to €[redacted]m). When the elasticity is applied the closest total ticket value is again F4R2 V6.

Table 4.5 Comparison of F R2 V6 Scenarios

	Base	F1R2V6	F1R2V6 Base Demand	F2R2V6	F2R2V6 Base Demand	F3R2V6	F3R2V6 Base Demand	F4R2V6	F4R2V6 Base Demand
Single Tickets	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Ave Single Fare	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Single Ticket Value	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Return Tickets	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Ave Return Fare	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Return Ticket Value	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Total Tickets	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Total Ticket Value	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

4.3.3 The change in fares is further explained in Table 4.6. The percentage weighted average and standard deviation of the fares changes for singles and returns for each FR2 V6 scenario are shown. The scenarios that rely only on single fares – F2 and F3 (with and without peak pricing) result in large changes in average fares for singles and to a lesser extent returns; they do not meet the criteria.

4.3.4 The percentage weighted average change is significantly less for F4R2 V6 for returns and equal lowest for singles. The percentage standard deviation is least for F2R2 V6 for singles and approximately the same for F4R2 V6 and F2R2 V6 when considering returns.

Table 4.6 Change in Fares

	F1R2V6	F2R2V6	F3R2V6	F4R2V6
Weighted Average % Change Singles	-20.11%	-39.67%	-41.67%	-18.17%
Weighted Average % Change return	4.89%	9.12%	8.93%	0.63%
Standard Deviation % Change Singles	7.46%	5.77%	11.25%	7.75%
Standard Deviation % Change return	15.87%	16.04%	25.31%	16.01%

Implication for Fares

F4R2V6 is significantly better than the alternatives based on the weighted average fare change. It is only slightly worse on other measures.

The objective of achieving a simplified fares structure which generates approximately the same fare levels as existing is achieved and hence this option, F4R2 V6, consisting of single, open returns and day returns is taken forward for further testing.

Sub-Options Testing

4.3.5 F4R2 V6 is brought forward for further sub-options testing. The following sub-option tests were undertaken: Z1 – Z6, where an open return discount and day discount was applied. The discounts applied are as follows:

- Z1: Open Return Discount 30%, Day Discount 40%;
- Z2: Open Return Discount 30%, Day Discount 45%;
- Z3: Open Return Discount 35%, Day Discount 40%;
- Z4: Open Return Discount 35%, Day Discount 45%;
- Z5: Open Return Discount 40%, Day Discount 45%; and
- Z6: Open Return Discount 25%, Day Discount 35%.

4.3.6 The range of these discounts was chosen (i.e. 30-45%) in order to achieve the objective of producing a consistent fares structure which produces as close to existing fares levels as possible. Lower discount levels would not achieve existing fares levels.

4.3.7 As stated previously, even though single tickets are considered, the focus will be more on the more popular return tickets.

4.3.8 The results of the F4R2 V6 Z sub-option tests are shown in Table 4.7. A trade off can be seen between improving the weighted average percentage change for singles and slightly worsening it for returns. Z2, Z4 and Z5 could all be considered. These all have 45% discount for day returns (the maximum that is reasonable, as return discounts must be less than 50% to avoid anomalies with single fares). A discount of 40% for open returns seems too similar to that for day returns. It is therefore recommended adopting a discount for open returns in the range 30% to 35%. We have adopted 30% (Z2) in the further analysis, as it generates the most demand.

Table 4.7 F4R2 V6 Preferred Sub-Option Tests

	F4R2V6 Z1	F4R2V6 Z2	F4R2V6 Z3	F4R2V6 Z4	F4R2V6 Z5	F4R2V6 Z6
Weighted Average % Change Singles	-18.82%	-18.71%	-14.50%	-13.76%	-8.77%	-23.24%
Weighted Average % Change return	2.56%	0.63%	3.41%	1.39%	2.27%	3.62%
Standard Deviation % Change Singles	7.65%	7.75%	8.33%	8.45%	9.33%	7.02%
Standard Deviation % Change return	16.79%	16.01%	18.30%	16.61%	18.08%	16.97%
Total Tickets	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Total Ticket Price	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

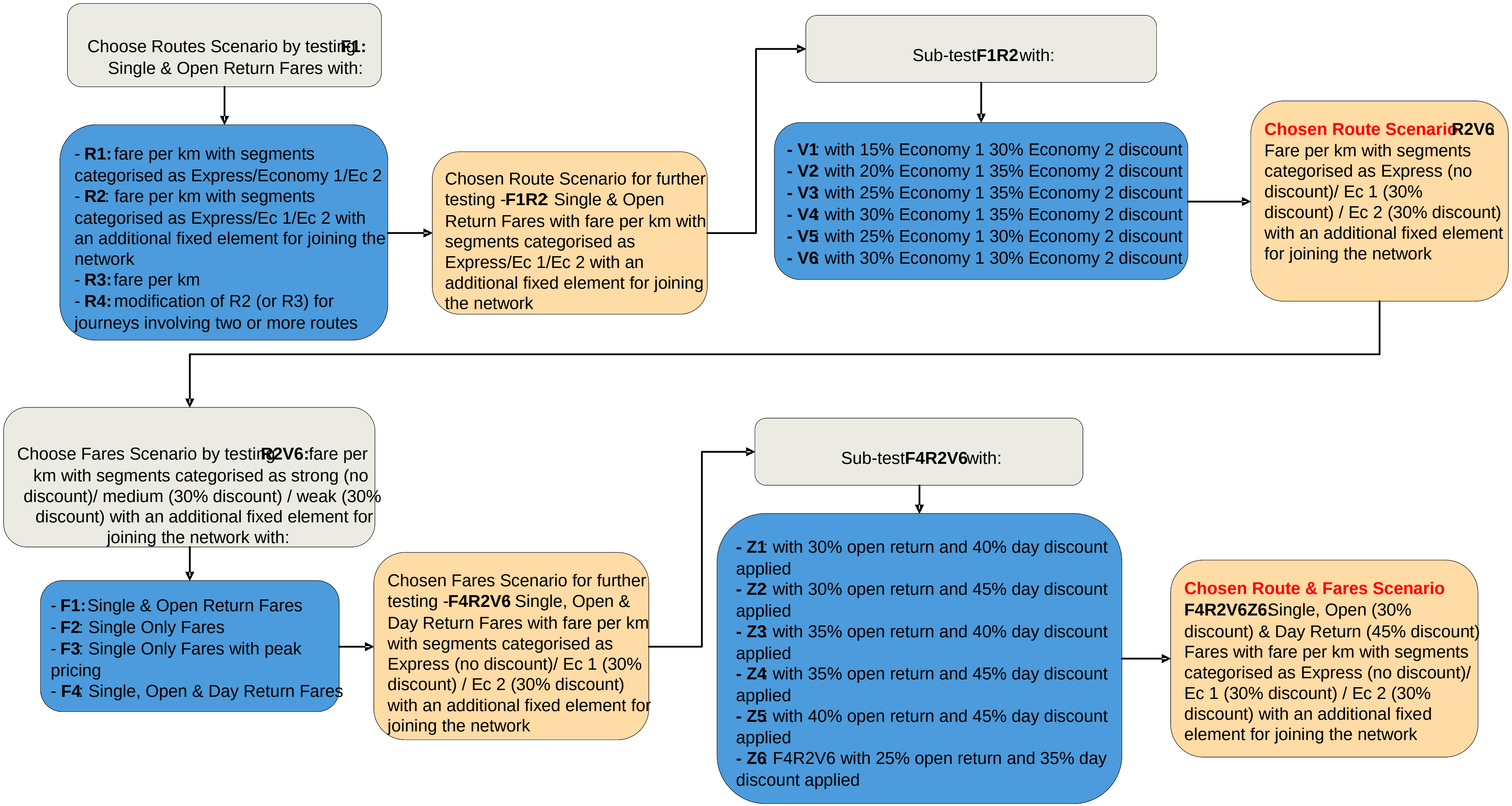
Preferred Scenario

4.3.9 The decision path followed to determine the preferred scenario is shown in Figure 4.1 below. As shown in this figure, the preferred scenario is (F4R2V6Z6):

- Single, Open (30% discount) & Day Return (45% discount) Fares
  - with fare per km
  - with segments categorised as Express (no discount)/ Economy 1 (30% discount) / Economy 2 (30% discount)
  - with an additional fixed element for joining the network.

4.3.10 The base total number of tickets is [redacted] and the corresponding total ticket price is €[redacted]. This compares to 1,086,419 tickets (approximately 35,000 more tickets than the base) and a total ticket price of €[redacted] assuming the preferred fares structure.

Figure 4.1 Decision Route to Preferred Scenario



4.4 Sensitivity Test

4.4.1 Irish Rail expressed a concern that, given the current recession, reduced fares may not succeed in generating demand in the expected manner. To reflect this concern, worst case sensitivity testing was undertaken for the emerging preferred scenario where passenger numbers remain constant despite fare changes.

4.4.2 The base number of tickets is 1,051,008. The preferred scenario generates the most tickets of all the 'Z' scenarios, where the total number of tickets increases to 1,100,758. This equates to 49,750 more tickets than the base.

4.4.3 If the preferred fares scenario is adopted but this doesn't result in an increase in tickets sold (i.e. tickets sold is set to zero) then total revenue is approximately €[redacted] compared to today's revenue for these tickets of €[redacted]. The risk is seen to be modest.

4.4.4 An additional test on the preferred scenario was also carried out to consider:

- If increases in ticket prices result in a decrease in ticket sales; and
- If ticket prices are reduced but ticket sales remain unchanged.

4.4.5 The result of this test show that the total ticket revenue reduces to €[redacted], compared to today's revenue for these tickets of €[redacted]. This scenario is deemed to be very unlikely.

4.5 Boundary with Commuter Zones

4.5.1 A sense check was undertaken to examine the fares structure at the commuter boundaries to ensure consistency. Table 4.8 shows the existing commuter fare versus the existing intercity fares to the next station across the boundary and the proposed fare for same journey.

4.5.2 Currently, there is a considerable difference in ticket prices between commuter tickets and intercity tickets. For example, the commuter single and return fares for the journey between Connolly and Balbriggan are €4.30 and €8.00 respectively. This is compared to €9.50 and €17.30 for the intercity single and return fares between Connolly and Gormanstown (the next stop across the boundary).

4.5.3 This large fare gap between adjoining commuter and intercity journeys is reduced considerably in the proposed fare structure. Using the same example (Connolly to Balbriggan v Gormanstown), in the proposed fare structure, the new intercity fares would be €9.51 (single), €10.46 (day return) and €13.32 (open return).

4.5.4 For the journey between Heuston and Hazelhatch/ Celbridge, the current commuter fare is approximately three times less than the existing day saver fare. This relatively difference is improved greatly in the proposed fare structure, but the commuter fare continues to be approximately half the intercity fare.

Implication for Fares

Considering all of the above, the chosen fares scenario is F4R2 V6 Z2:

- *Single, open return and day return fares with fare per km + additional fixed fare*
- *30% discount applied to Economy 1 and Economy 2 routes*
- *30% open return discount and 45% day return discount applied to twice the single fare*

Table 4.8 Comparison of Commuter and Intercity Fares

Commuter Journey	Existing Commuter		Journey across Boundary	Existing			F4R2V6Z2		
	Single Fare	Return Fare		Single	Day Saver	Monthly Saver	Single	Day Return	Open Return
Connolly – Maynooth	€3.30	€6.00	Connolly – Kilcock	€7.50	€10.20	€14.00	€6.61	€7.27	€9.26
Connolly - Balbriggan	€4.30	€8.00	Connolly – Gormanstown	€9.50	€17.30	€17.30	€9.51	€10.46	€13.32
Connolly - Kilcoole	€4.30	€8.00	Connolly – Wicklow	€13.00	€15.40	€19.20	€8.47	€9.32	€11.86
Heuston – Hazelhatch/Celbridge	€2.30	€4.20	Heuston – Sallins/Naas	€7.00	€13.70	€19.30	€8.00	€8.80	€11.19

4.6 Credit Card and Other Fees

4.6.1 The objective of any such charges should be to encourage purchase at points of sale that are cheaper for IÉ, but at the same time being seen to be reasonable by customers.

4.6.2 The current position with regard to additional fees for tickets is that at stations there is no fee, but on-line there is a fee of €2, plus an additional fee of €1 if paying with a credit (as opposed to debit) card.

4.6.3 However, the cost of sale is typically greater at stations than on-line; it will be greater for credit card sales than debit, but by less than €1.

4.6.4 Customers do not like additional fees, and the European Union has just voted (see press release 23 June 2011[1]) to introduce legislation that enforces transparency and restricts the ability of organisations to charge more for add-on services such as credit cards than the cost they incur – see item 7 in reference.

4.6.5 The online booking fee seems to give counter-productive signals regarding where customers should purchase tickets and is not liked by them. It should be cancelled, and to recover the money, IÉ should increase the price of the Advance Purchase tickets sold only online. For the limited number of other online sales, there is a choice between making a small general increase, or accepting the slightly lower revenue; anyway the more wide ranging changes proposed in this report would have much greater effects on revenue, both positive and negative.

4.6.6 While the €1 credit card does give the right signal, it is probably greater than the cost incurred by IÉ and hence may become illegal when the EC legislation is enacted. It also seems illogical to charge for credit cards online, but not at stations (although we recognise that this in common with almost all retail outlets in Ireland and the rest of Europe, no charge is usually made for credit cards). We would therefore recommend the online credit card fee is also cancelled. The revenue lost could easily be made up through minor adjustments of overall fares levels.

4.6.7 However, customers do recognise that charging for posting tickets is reasonable, and charges for this service would be acceptable.

[1] http://europa.eu/rapid/pressReleasesAction.do?reference=MEMO/11/450&format=HTML&aged=0&language=EN&guiLanguage=en

5 Summary, Recommendations & Next Steps

5.1 Summary

5.1.1 This report presented the Intercity Fares Structure Review and has identified a consistent, simplified fare structure for standard fares that meets the following objectives:

- Consistent;
- Avoids anomalies;
- Meets market requirements; and
- Broadly neutral in terms of revenue.

5.1.2 The proposed new fares structure also achieves a small overall increase in passenger numbers (estimated at 4.7%).

5.2 Conclusion

5.2.1 While the options chosen are broadly revenue neutral, the analysis undertaken assists in evaluating alternative fare options which are revenue raising. The key findings of the scenario testing are:

Route Scenarios

- F1R2 and F1R4 are very similar scenarios:
  - F1R2: Single & Open Return Fares with fare per km with segments categorised as Express/Economy 1/Economy 2 with an additional fixed element for joining the network
  - F1R4: Single & Open Return Fares and modification of R2 for journeys involving two or more routes
- The results for both of these scenarios (F1R2 and F1R4) accrue very similar total revenues and are jointly closest to the base total revenue. When considering the scenarios on a route by route basis, the preferred scenario varies depending on which route is taken.
- Single & Open Return Fares with fare per km with segments categorised as Express/Economy 1/Economy 2 with an additional fixed element for joining the network is the preferred Fares Scenario because it is simpler than F1R4 (modified when involving two or more routes) –both very similar scenarios producing very similar results.
- Choosing F1R2, discounts were applied to Economy 1 and Economy 2 routes. When 30% and 35% discount was applied to Economy 1 and Economy 2 routes

respectively (V4) and 30% discount was applied to both Economy 1 and Economy 2 routes (V6) the results are very similar, with V4 giving slightly better results. However, because V6 is simpler (30% for each) this will be our preferred option.

Fares Scenarios

- Scenarios F2 and F3 with only single fares do not meet the criteria of minimising winners and losers:
  - F2: Single Only Fares
  - F3: Single Only Fares with Peak Pricing
- The scenario with separate day return fares, as well as open returns (F4) is an improvement on that with only open returns (F1), and the added modest complication seems worthwhile.
- The discount for day returns should be 45% of twice the single fare (i.e. the maximum possible without introducing anomalies); the discount for open returns should be less at 30% to 35%.

Sensitivity Test

- The base number of tickets is 1,051,008 and the preferred scenario generates 1,100,758 tickets. This equates to 49,750 more tickets than the base. If the increase in tickets sold is set to zero, then total revenue is approximately €[redacted] compared to today's revenue for these flows of €[redacted]. The risk is seen to be modest.
- If increases in ticket prices result in a decrease in ticket sales and if ticket prices are reduced but ticket sales remain unchanged, total ticket revenue reduces to €[redacted], compared to today's revenue for these tickets of €[redacted]. This scenario is deemed to be very unlikely.

Boundary with Commuter Zones

- With the preferred scenario, there would continue to be a considerable difference between commuter fares and intercity fares to the next stop across the commuter zone boundary.

Credit Card and Other Fees

- The online booking fee seems to give counter-productive signals regarding where customers should purchase tickets and is not liked by them. It should be cancelled, and to recover the money, IÉ should increase the price of the Advance Purchase tickets sold only online.
- It is also recommended that the online credit card fee is cancelled. The revenue lost could easily be made up through minor adjustments of overall fares levels.

5.3 Recommendations

5.3.1 Considering all of the above, the chosen fares scenario is F4R2 V6 Z2. This scenario includes:

- Single, and open return and day return fares with fare per km + additional fixed fare
  - This is preferred on the basis that the very high average percentage change in single fares is avoided, and the standard deviations of the fares differences are smaller.
- 30% discount applied to both Economy 1 and Economy 2 routes
  - This is preferred because it is the 2nd closest to the base scenario (marginally worse than assuming 30% discount for Economy 1, 35% discount for Economy 2) but because the percentage discounts are the same for Economy 1 and Economy 2 routes it is simpler to apply.
- 30% open return discount and 45% day return discount applied to twice the single fare.
  - This scenario is significantly better than the alternatives based on the weighted average fare change. It is only slightly worse on other measures.
  - A trade off was seen between improving the weighted average percentage change for singles and slightly worsening it for returns. Three scenarios have 45% discount for day returns (the maximum that is reasonable, as return discounts must be less than 50% to avoid anomalies with single fares). A discount of 40% for open returns seems too similar to that for day returns. It is therefore recommended adopting a discount for open returns in the range 30% to 35%. 30% was chosen in the further analysis, as it generates the most demand.

5.3.2 Assuming the recommended fares structure, it is estimated that there will be 1,086,419 tickets and a total ticket price of €[redacted]. The base total number of tickets is 1,051,008 and the corresponding total ticket price is €[redacted]. Therefore, the recommended fares structure will accrue approximately 35,000 more tickets than the base.

5.4 Next Steps

5.4.1 Take forward the above recommendations and develop a short term implementation delivery plan.