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a Concetta e Vincenzo,

che continuano a credere in me.

a Tal,

che porto nel cuore.

Indice

Prefazione 6

Raccolta degli *abstract* 10

Abstract collection 13

Opportunità di *pre-funding* delle infrastrutture aeroportuali italiane alla luce di un'analisi di *benchmarking* delle tariffe dei servizi aeroportuali internazionali* 15

Keywords 16

Abstract 16

1. Introduzione 17

2. Infrastrutture aeroportuali e investimenti: riflessioni sull'assetto regolatorio del settore 18

2.1. Il quadro di riferimento del trasporto aereo 18

2.2. Le necessità di riorganizzazione e di potenziamento del sistema aeroportuale italiano 21

2.3. Le criticità del sistema aeroportuale italiano 23

2.4. I principali nodi critici 25

3. Le risorse finanziarie potenzialmente generate da un adeguamento tariffario: *benchmarking analysis* per l'aeroporto di Roma Fiumicino 31

3.1. La regolazione economica 31

3.2. La *benchmarking analysis* internazionale, in condizioni di reciprocità tariffaria, per lo scalo di Roma Fiumicino 32

4. Alcune riflessioni conclusive 42

Riferimenti bibliografici 46

The role of the discount rate in cost-benefit analysis between theory and practice: a comparative survey* 48

Keywords 49

Abstract 49

1. Introduction 50

2. The role of the discount rate in cost-benefit analysis: a theoretical approach 52

2.1.The social discount rate: which rate should be adopted? 52

2.2. The intergenerational discounting problem: should the social discount rate be adjusted?....54

2.3. The Sensitivity Analysis: A Workable Solution for the Social Discount Rate Issue....55

3. The role of the discount rate in cost-benefit analysis: empirical evidence....56

3.1. The discount rate suggested by institutional actors — US and EU compared....56

3.2. Regulatory discount rate analysis in practice—US and EU compared....61

3.3. An overview of the empirical evidence....65

4. Conclusions....66

Acknowledgments....68

Bibliography....69

The harmonization of market entry regulation for the operation of air services in the European Union: a comparative survey of the implementation of Regulation (EC) no. 1008/2008 by member states' authorities....72

Keywords....73

Abstract....73

1. Introduction....74

1.1. Air transport industry, from regulation to controlled liberalization....74

1.2. The operating license granting, a persistent form of market entry regulation....74

1.3. Did Regulation 1008/2008 introduce a harmonization of entry regulation in the European air transport market?....75

2. A quick description of Chapter II of Regulation 1008/2008, the role of the operating license....77

2.1. The main reason for the economic regulation....77

2.2. Chapter II, the operating license....77

2.3. Emerging issues....80

3. A comparative survey of the implementation of Regulation 1008/2008 by member states' authorities....81

3.1. Methodology....81

3.2. The licensing activity in the EU market for air services....83
3.3. National laws or regulations implementing Regulation 1008/2008....84
3.4. Information and data requested from undertakings for the assessment of the financial fitness....85
3.5. Methods and tools for the assessment of the financial fitness and proxies of emerging financial problems....90
4. Results, discussion, and further research....93
4.1. The heterogeneous implementation of Reg. 1008/2008....93
4.2. Fostering harmonization....93
4.3. Further research....96
Acknowledgments....97
Bibliography....98
The "dark side" of code-sharing - The anticompetitive effects of code-sharing agreements among airlines*....100
Keywords....101
Abstract....101
1. Introduction....102
1.1. Code-sharing agreement, pros and cons....102
1.2. A quick overview of the relevant literature....102
1.3. Research question....104
2. Materials and methods....105
2.1. Basic regression model, dependent variable, and time horizon....105
2.2. Main data....106
2.3. Independent variables....108
2.4. Summary statistics....112
3. Empirical evidence....113
3.1. Approach #1, air carriers' operating expenses per adjusted-mile....113
3.2. Approach #2, air carriers' dummies....117
4. Conclusions....119

Acknowledgments 120
Bibliography 121

Prefazione

Ai fini del conseguimento del titolo di dottore di ricerca, il Collegio dei docenti del Dottorato di ricerca in Diritto ed Economia della LUISS "Guido Carli" ha previsto per gli iscritti al Ciclo XXV la possibilità di redigere un minimo di tre articoli scientifici in alternativa alla stesura di un singolo lavoro monografico.

In pieno accordo col professor Cesare Pozzi, che mi ha guidato durante l'intera esperienza dottorale e al quale va la mia sincera gratitudine, ho deciso di cogliere questa opportunità in modo tale da approfondire temi differenti con l'obiettivo finale di realizzare *paper* scientifici da pubblicare su riviste di alto profilo. Una scelta simile ha richiesto un percorso di studio e ricerca con caratteristiche peculiari, si sono infatti moltiplicati gli sforzi in termini di *review* della letteratura di riferimento, di individuazione della domanda di ricerca e di selezione dei metodi e di raccolta dei materiali più adeguati per il raggiungimento dei risultati attesi. Allo stesso tempo questa scelta mi ha permesso di sottoporre, in itinere, tre degli articoli qui presentati al vaglio di *referees* anonimi, i quali nell'ambito di altrettanti processi di pubblicazione hanno fornito riscontri che si sono rivelati preziosi nel tentativo di migliorare la qualità scientifica dei lavori.

Ho deciso di basare la selezione dei singoli argomenti di ricerca affrontati su due semplici criteri, tra loro coniugabili. Da un lato ho seguito le mie passioni e inclinazioni, cercando sempre nell'attività di studio e ricerca i necessari stimoli intellettuali. Dall'altro, invece, ho preferito focalizzare l'attenzione su temi di immediato interesse non solo per la comunità accademica, ma anche per il mondo delle imprese e delle istituzioni. Questo secondo criterio è particolarmente affine al tipo di ricerca, di natura applicata, che ormai da anni è realizzata alla LUISS "Guido Carli" da gruppi di ricerca come il GRIF "Fabio Gobbo" e la Divisione Ricerca e Consulenza della LUISS "Business School" con i quali ho avuto modo di trovare proficue forme di collaborazione durante i miei di studi dottorali, grazie al supporto del professor Gian Maria Gros-Pietro e del professor Matteo Giuliano Caroli.

In virtù dei criteri qui esposti, ho scelto di approfondire le tematiche della cosiddetta "*old law and economics*", ovvero della regolazione e della concorrenza, che hanno costituito la spina dorsale del mio percorso dottorale e il mio principale interesse. Più nello specifico, alla luce dell'esperienza maturata sul campo nelle attività di ricerca applicata, ho deciso di analizzare le possibili declinazioni di tali

tematiche nel settore del trasporto aereo, dando seguito peraltro a un filone di ricerca che mi aveva appassionato sin dai tempi della laurea magistrale. È così che tre *paper* dei quattro raccolti in questo volume sono legati da un *fil rouge* riconducibile alla *law and economics* del trasporto aereo. A latere, l'analisi di impatto della regolamentazione ha costituito un ulteriore tema di particolare interesse affrontato in questi anni, giustificando perciò un excursus sulla *cost-benefit analysis of law-making*, argomento su cui invece verte il quarto *paper*.

Il volume costituisce dunque una raccolta dei quattro articoli redatti durante l'esperienza di dottorato, presentati in ordine cronologico di realizzazione, nella speranza di dare al lettore la possibilità di apprezzare il percorso di maturazione accademica seguito nel corso del triennio. Ciascun articolo è accompagnato da un *abstract* che ne sintetizza i principali contenuti. Qui di seguito, tuttavia, ho preferito offrire una rapida presentazione di ogni lavoro, al fine di illustrare le specifiche motivazioni che hanno condotto alla scelta dei temi trattati, i "*selected topics in regulation and competition*" a cui rimanda il titolo dell'opera.

Il primo lavoro, "Opportunità di *pre-funding* delle infrastrutture aeroportuali italiane alla luce di un'analisi di *benchmarking* delle tariffe dei servizi aeroportuali internazionali" (di recente pubblicato su *l'industria*, rivista edita da *Il Mulino*), è stato concepito all'inizio del 2010, sviluppando un'idea contenuta in forma embrionale nella mia tesi di laurea magistrale. Nella pratica si riscontrava, infatti, la difficoltà da parte delle società di gestione degli aeroporti italiani a effettuare nuovi investimenti infrastrutturali. A più riprese i gestori lamentavano l'inadeguatezza del sistema di regolamentazione tariffaria nazionale che tuttora non consente la raccolta di sufficienti risorse finanziarie. La proposta di introdurre un meccanismo di prefinanziamento delle infrastrutture e di trovare nel progressivo allineamento dei compensi nazionali a quelli degli aeroporti esteri le necessarie risorse ha suscitato grande interesse da parte di Aeroporti di Roma che ha offerto un imprescindibile supporto alle attività di ricerca. Questo *paper* è stato realizzato in stretta collaborazione col professor Davide Quaglione, la cui guida si è rivelata una preziosa occasione di crescita personale e professionale.

Il secondo articolo, "*The role of the discount rate in cost-benefit analysis between theory and practice: a comparative survey*" (che verrà pubblicato su *European Journal of Risk Regulation*, edito da *Lexxion*), ha trovato invece le sue radici in un dibattito stimolato in aula dalla professoressa Alessandra Arcuri, durante le lezioni del suo corso di *Public Law and Economics*, che ho frequentato presso l'*Erasmus Universiteit* di Rotterdam nell'autunno 2010. In quella circostanza si era posta

l'attenzione sui numerosi problemi metodologici che interessano la *cost-benefit analysis* di leggi e regolamenti ed era emersa l'idea che esistesse uno scostamento tra le soluzioni suggerite dalla teoria economica e giuseconomica e le esigenze pratiche degli analisti. Questo argomento è risultato di particolare interesse per la *School of Law* della *UC Berkeley*, dove ho avuto appunto modo di dare avvio, nella primavera 2011, alle attività di ricerca per la stesura del *paper*, grazie all'opportunità offerta dal *Board* dell'*European Master in Law and Economics*. Proprio a Berkeley ho scelto di approfondire il tema del tasso di sconto, una variabile la cui selezione è molto controversa nella letteratura economica ed è cruciale nel decretare il destino di una norma la cui approvazione dipenda da un'analisi di impatto basata sul metodo della *cost-benefit analysis*.

Il tema del terzo *paper*, "*The harmonization of market entry regulation for the operation of air services in the European Union: a comparative survey of the implementation of Regulation (EC) no. 1008/2008 by member states' authorities*" (che verrà pubblicato su *Journal of Air Transport Management*, edito da *Elsevier*), nasce da un'esigenza pratica espressa dall'Ente Nazionale per l'Aviazione Civile che si era rivolto nel 2010 alla LUISS "*Business School*" al fine di implementare correttamente le disposizione di cui al Regolamento (CE) n. 1008/2008. Lo studio di questo regolamento ha permesso di evidenziare l'elevato grado di aleatorietà di fatto concesso nella sua applicazione a livello nazionale e ha perciò stimolato un'indagine internazionale volta a comprendere le scelte fatte dalle autorità competenti dei principali Paesi europei, nella consapevolezza che il riscontro di un'elevata eterogeneità avrebbe segnalato un elemento di debolezza nel processo di armonizzazione dell'accesso al mercato comunitario del trasporto aereo, cui il regolamento aspirava. Il lavoro di ricerca, iniziato nel 2010 e terminato nei primi mesi del 2012, è stato svolto in collaborazione col professor Caroli, la cui supervisione ha costituito un'ulteriore occasione di arricchimento sul piano personale e professionale.

Il quarto lavoro, infine, "*The "dark side" of code-sharing - The anticompetitive effects of code-sharing agreements among airlines*" (presentato nel 2012 a Bruxelles nell'ambito della conferenza *Competition and Regulation in Network Industries*) è centrato su un tema di grande interesse per l'Autorità *Antistrust* Israeliana. Ho avuto, infatti, l'incredibile opportunità di svolgere un periodo di studio e ricerca presso la *Tel Aviv University* nell'estate 2012, sotto la stimolante supervisione del professor David Gilo, che attualmente è a capo dell'autorità *antitrust* nazionale. Numerosi accordi di *code-sharing* sono sottoposti al vaglio di tale istituzione. Per

questa ragione e alla luce delle caratteristiche geografiche del Paese, che fanno dell'unico scalo internazionale israeliano, l'aeroporto Ben Gurion di Tel Aviv, un punto terminale di arrivo e partenza piuttosto che un *hub* di scalo intermedio per itinerari di tipo *hub and spoke*, è sembrato necessario un approfondimento degli effetti che tali accordi hanno sulla concorrenza tra compagnie aeree nel mercato dei voli *point-to-point*, un argomento questo in gran parte trascurato dalla letteratura giuseconomica di riferimento.

Di seguito è, innanzitutto, offerta una raccolta degli *abstract* sia in italiano che in inglese. Si include poi il testo integrale dei quattro articoli, nell'ordine in cui sono stati qui presentati, il primo in lingua italiana, i successivi in inglese.

Raccolta degli *abstract*

Opportunità di *pre-funding* delle infrastrutture aeroportuali italiane alla luce di un'analisi di *benchmarking* delle tariffe dei servizi aeroportuali internazionali

A fronte delle opportunità di crescita associate al forte aumento della domanda di trasporto aereo previsto per il prossimo ventennio, risultano ormai improcrastinabili misure di regolazione e di politica industriale volte alla razionalizzazione e al potenziamento del sistema aeroportuale italiano. La definizione di un quadro di regole stabili che non inibisca gli investimenti per lo sviluppo dell'offerta di servizi aeroportuali, unitamente al recupero di una "visione di insieme" del trasporto aereo nazionale costituiscono, in tale prospettiva, elementi di assoluta importanza. In un regime tariffario di *single till* parziale, escludendo nuovi interventi pubblici per il finanziamento delle opere, suscita interesse l'opzione di utilizzare forme controllate di prefinanziamento degli investimenti, da realizzare mediante adeguamenti tariffari *ad hoc* concessi caso per caso ai gestori degli scali da potenziare. In questo lavoro si propone, oltre a una riflessione generale sull'assetto del settore italiano, una *benchmarking analysis* internazionale delle tariffe dei servizi aeroportuali, centrata sullo scalo di Roma Fiumicino, stimando così le risorse aggiuntive che sarebbero annualmente disponibili per il *pre-funding* di nuove infrastrutture nell'aeroporto romano qualora, a parità di movimenti e di passeggeri, si attuasse un allineamento dei corrispettivi interni ai livelli tariffari esteri.

Il ruolo del tasso di sconto nell'analisi costi-benefici tra teoria e pratica: un'analisi comparativa

La comprensione del ruolo del tasso di sconto nell'analisi costi-benefici (ACB) di leggi e regolamenti richiede un studio sistematico sia delle teorie economiche maggiormente accreditate sia della loro applicazione nella pratica regolatoria. Dopo aver offerto una disamina della principale letteratura economica sul tema del tasso di sconto sociale (TSS), si effettua un'indagine approfondita dell'attuale prassi istituzionale. In primis si confrontano le linee guida, redatte dalle istituzioni competenti negli Stati Uniti e nell'Unione Europea, che mirano a fornire indicazioni in merito alla realizzazione di ACB e, nello specifico, alla quantificazione del valore attuale di costi e benefici futuri. In secondo luogo si esaminano i TSS effettivamente

adottati in due campioni di ACB scelti tra le *Regulatory Impact Analysis* dell'*Environmental Protection Agency* statunitense e gli *Impact Assessment* della DG *Environment* europea. Si riscontra l'esistenza di un divario tra la teoria economica e la pratica istituzionale nella scelta del TSS. Le ACB sono basate, infatti, sugli strumenti più "pratici" suggeriti dalla letteratura economica, piuttosto che su quelli più corretti sotto il profilo teorico. Per migliorare la qualità del processo normativo, gli economisti che sostengono l'applicazione della ACB dovrebbero tenere maggiormente in considerazione la "validità operativa" dei risultati delle loro ricerche, fornendo così agli analisti metodi che siano tanto affidabili sul piano teorico quanto attuabili nella pratica.

L'armonizzazione della regolazione all'accesso nel mercato del trasporto aereo nell'Unione Europea: un'indagine comparativa sull'implementazione del Regolamento (CE) n. 1008/2008 da parte delle autorità dei Paesi membri

Il Regolamento (CE) n. 1008/2008 ha confermato il rilascio della licenza operativa come forma di regolazione all'accesso nel mercato del trasporto aereo dell'Unione Europea. L'indagine comparativa inclusa in questo studio è basata su dati e informazioni raccolti mediante questionario tra 13 autorità dell'aviazione civile di Paesi membri nel corso del 2010. In particolare, viene evidenziato come l'eterogenea implementazione del regolamento oggetto d'analisi da parte delle autorità nazionali finisca per imporre obblighi differenti a imprese che hanno lo stesso identico diritto di operare servizi di trasporto aereo nel mercato europeo. Una combinazione di concorrenza e collaborazione tra le autorità dell'aviazione civile è la via da percorrere per favorire un'effettiva armonizzazione della regolazione all'accesso al mercato. Più nello specifico, mantenendo l'attuale livello di autonomia di cui godono le autorità nazionali, ma migliorando i flussi informativi sia tra di esse sia nei confronti della Commissione europea, potrebbero essere agevolmente raggiunti esiti di armonizzazione volontaria.

Il "lato oscuro" del code-sharing – Gli effetti anticompetitivi degli accordi di code-sharing tra compagnie aeree

Il *paper* ha l'obiettivo di valutare l'impatto degli accordi di code-sharing (ACS) sulla concorrenza tra compagnie aeree nel mercato per i servizi di trasporto aereo *non-stop*. L'analisi econometrica inclusa in questo studio si basa su dati estratti dal database "*Airline Origin and Destination Survey* (DB1B)" messo a disposizione dal

Department of Transport degli Stati Uniti. In particolare, i possibili effetti anticompetitivi degli ACS sono stati catturati misurando il loro impatto sulle tariffe pagate per i biglietti di "*restricted coach class*" su itinerari *point-to-point* di andata e ritorno nel mercato domestico statunitense, durante il primo trimestre del 2012. La presenza di ACS è associata a un incremento delle tariffe tra l'11,3% e il 19,2%, a seconda dei metodi di stima utilizzati. La correlazione positiva e significativa tra ACS e livello tariffario può essere considerata come il risultato di collusione sul prezzo tra le compagnie aeree firmatarie degli accordi. Per la prima volta, il "lato oscuro" degli ACS è stato evidenziato e misurato, fornendo così informazioni di rilievo per le autorità della concorrenza.

Abstract collection

Pre-funding opportunities for Italian airport infrastructures in light of a benchmarking analysis of international airport charges and fees

The sharp increase in demand for air transport expected in the next two decades and the growth opportunities associated with it call for regulatory and industrial policy measures aiming at rationalizing and strengthening the Italian airport system. The definition of consistent rules and the adoption of a more "systematic" vision of the sector by policy makers are crucial elements to foster new investments in order to enhance airport service supply. Given the current "single till" regime and excluding further public spending, pre-financing of airport capital expenditures is the most viable approach to gather financial resources for new investments. A benchmarking analysis of international airport charges and fees shows that Rome Fiumicino airport charges are well below those paid abroad. Hence, wide margins exist for an upward adjustment of the national airport charges, with the objective of generating, where needed, a substantial amount of resources to develop new infrastructures.

The role of the discount rate in cost-benefit analysis between theory and practice: a comparative survey

This study focuses on the role of the discount rate in cost-benefit analysis (CBA) of regulation, providing a systematic investigation into regulatory practice vis-à-vis the existing economic theories. In the first part, a quick survey of the main economic literature on the social discount rate (SDR) is presented. In the second part, the current institutional practice is investigated, firstly comparing the recommendations on discounting issued by institutional actors in the US and the EU, and secondly examining the SDRs adopted in two samples of CBAs selected among Regulatory Impact Analyses of US Environmental Protection Agency and Impact Assessments of EU DG Environment. A gap exists between economic theory and institutional practice in the selection of the SDR. Regulatory decisions which are based on CBA reflect the most workable economic literature on discounting rather than the most theoretically consistent one. Scholars who aim at improving the quality of rule-making and at fostering the application of CBA in regulatory decisions should improve the “operational validity” of their research, thus providing practitioners with methods that are both consistent and workable.

The harmonization of market entry regulation for the operation of air services in the European Union: a comparative survey of the implementation of Regulation (EC) no. 1008/2008 by member states' authorities

Regulation (EC) no. 1008/2008 confirmed the operating license granting as a persistent form of entry regulation in the EU air transport market. The comparative survey included in this study is based on data and information collected via questionnaire among 13 aviation authorities of European member states during 2010. This survey suggests that the heterogeneous implementation of the 2008 regulation by national authorities results in imposing unequal obligations on undertakings that have the equal right to operate in the European market for air services. A mix of competition and cooperation among authorities is the most viable approach to foster an effective harmonization of entry regulation in this market. In particular, by maintaining the current level of independence of national authorities, but enhancing information flows among them as well as between them and the European Commission, a voluntary harmonization can be achieved.

The "dark side" of code-sharing - The anticompetitive effects of code-sharing agreements among airlines

The paper aims at assessing the impact of code-sharing agreements (CSAs) on competition among airlines in the market for non-stop air transport services. The econometric analysis included in the study is based on data drawn from the database "Airline Origin and Destination Survey (DB1B)" compiled by the US Department of Transport. In particular, the possible anticompetitive effects of CSAs are captured by appraising their impact on fares for "restricted coach class" tickets for point-to-point round trip itineraries in the US domestic market during the first quarter of 2012. The presence of a CSA is associated with an increase in airfares between 11.3% and 19.2%, based on different estimation methods. The positive and significant correlation between CSAs and the level of fares can be considered the outcome of price collusion among signatory airlines. For the first time, the "dark side" of CSAs has been spotted and measured, thus providing a valuable insight to competition authorities.

Opportunità di *pre-funding* delle infrastrutture aeroportuali italiane alla luce di un'analisi di *benchmarking* delle tariffe dei servizi aeroportuali internazionali*

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*L'articolo è stato pubblicato sul numero 4/2012 de *l'industria, rivista di economia e politica industriale*, edita da *Il Mulino*. Il lavoro è stato supervisionato e co-autorato dal professor Davide Quaglione, professore associato di Economia Applicata presso la Facoltà di Economia dell'Università "G. d'Annunzio" di Chieti e Pescara.

Keywords

Benchmarking analysis, Dual till, Prefinanziamento, Tariffe servizi aeroportuali, Single till.

Abstract

A fronte delle opportunità di crescita associate al forte aumento della domanda di trasporto aereo previsto per il prossimo ventennio, risultano ormai improcrastinabili misure di regolazione e di politica industriale volte alla razionalizzazione e al potenziamento del sistema aeroportuale italiano. La definizione di un quadro di regole stabili che non inibisca gli investimenti per lo sviluppo dell'offerta di servizi aeroportuali, unitamente al recupero di una "visione di insieme" del trasporto aereo nazionale costituiscono, in tale prospettiva, elementi di assoluta importanza. In un regime tariffario di *single till* parziale, escludendo nuovi interventi pubblici per il finanziamento delle opere, suscita interesse l'opzione di utilizzare forme controllate di prefinanziamento degli investimenti, da realizzare mediante adeguamenti tariffari *ad hoc* concessi caso per caso ai gestori degli scali da potenziare. In questo lavoro si propone, oltre a una riflessione generale sull'assetto del settore italiano, una *benchmarking analysis* internazionale delle tariffe dei servizi aeroportuali, centrata sullo scalo di Roma Fiumicino, stimando così le risorse aggiuntive che sarebbero annualmente disponibili per il *pre-funding* di nuove infrastrutture nell'aeroporto romano qualora, a parità di movimenti e di passeggeri, si attuasse un allineamento dei corrispettivi interni ai livelli tariffari esteri.

1. Introduzione

La realizzazione degli investimenti infrastrutturali nei settori sottoposti a regolamentazione economica resta, nel concreto, una questione estremamente spinosa. La letteratura scientifica ha contribuito a chiarire quali connotati debba necessariamente avere un sistema di regole volto a incentivare investimenti efficienti – sotto il profilo quantitativo, qualitativo e del *timing* – qualora valgano talune precise ipotesi (relative, ad esempio, alla razionalità degli operatori, all'informazione disponibile, all'omogeneità dei prodotti e delle preferenze dei consumatori). Molteplici difficoltà, tuttavia, permangono quando si riflette su contesti reali, spesso decisamente distanti dai modelli che vorrebbero rappresentarli.

Tale circostanza è testimoniata dai ferventi dibattiti che stanno caratterizzando le recenti scelte di politica regolatoria e industriale: si pensi, ad esempio, ai servizi pubblici locali (in particolare al servizio idrico integrato) e al comparto delle comunicazioni elettroniche (in relazione alle modalità con le quali favorire la stesura di un'infrastruttura di accesso a banda larga di nuova generazione).

Da questo punto di vista, il settore aeroportuale assume particolare rilievo. Nonostante la flessione della domanda di servizi di trasporto aereo registrata tra il 2008 e il 2009 – dovuta evidentemente agli effetti della crisi finanziaria ed economica dipanatasi a livello mondiale – il traffico aereonautico è tornato a crescere nel 2010 e nel 2011 ed è previsto in forte crescita nell'arco del prossimo ventennio. Di fronte a una simile prospettiva, un sistema aeroportuale deve porsi nelle condizioni di cogliere le opportunità di crescita e i molteplici benefici attesi associati allo sviluppo del settore. Si fa dunque sempre più pressante – soprattutto nel contesto italiano, tarpato da un'evoluzione infrastrutturale lenta e priva di una visione strategica – l'esigenza di effettuare scelte in termini di regolazione e di politica industriale che possano promuovere gli investimenti necessari e consentire così una crescita razionale della capacità offerta.

Da un lato, quindi, risulta indispensabile la predisposizione di un piano nazionale che individui la necessità di investimenti sulla base di una "visione d'insieme" del sistema aeroportuale e, più in generale, del sistema nazionale dei trasporti; dall'altro invece è essenziale fornire alle società di gestione opportuni incentivi a investire. Il legislatore nazionale ha di recente preso atto di questa situazione, prevedendo prima nella legge n. 96/2010 (art.39.1) e poi nel d.l. 24 gennaio 2012 n. 1 (d'ora in avanti Decreto Liberalizzazioni) che i modelli di tariffazione per le

infrastrutture aeroportuali siano anche volti ad incentivare gli investimenti "nell'ambito di una crescita bilanciata della capacità aeroportuale" (art. 71.3).

In tale quadro, escludendo nuovi interventi pubblici per il finanziamento delle opere, suscita indubbio interesse la prospettiva di utilizzare forme controllate di prefinanziamento degli investimenti, da realizzare mediante opportuni adeguamenti tariffari concessi ai gestori degli scali da potenziare. Gli spazi concretamente a disposizione per una crescita delle tariffe aeroportuali e per la raccolta di risorse aggiuntive dedicate alla realizzazione delle necessarie opere possono essere accertati effettuando un confronto tra i compensi incassati dagli scali nazionali e quelli praticati negli aeroporti esteri: la fissazione di tariffe molto contenute, infatti, potrebbe essere alla base dell'incapacità dei gestori di adeguare l'offerta alla potenziale crescita della domanda, generando così una situazione di asfissia finanziaria per l'intero sistema aeroportuale nazionale. Non va, inoltre, trascurato il fatto che lo stesso legislatore nel Decreto Liberalizzazioni auspichi che nella determinazione dei diritti aeroportuali si tenga conto della media europea dei diritti praticati in aeroporti con caratteristiche analoghe (art. 80.1). Un'analisi empirica di questo tipo, dunque, potrà fornire materiale utile per le scelte della futura "Autorità dei Trasporti" (art. 36, Decreto Liberalizzazioni).

Il lavoro è strutturato come segue. Nel paragrafo 2 si propone una riflessione sulle criticità che, con particolare riferimento al tema degli investimenti, caratterizzano il settore aeroportuale italiano. Nel paragrafo 3 si sviluppa una *benchmarking analysis* internazionale delle tariffe dei servizi aeroportuali, con l'obiettivo di accertare quante risorse aggiuntive potrebbero essere disponibili per il finanziamento di nuove infrastrutture qualora, a parità di movimenti e di passeggeri, si attuasse un adeguamento delle tariffe interne[1] ai livelli praticati all'estero. Il paragrafo 4, infine, offre alcune considerazioni conclusive.

2. Infrastrutture aeroportuali e investimenti: riflessioni sull'assetto regolatorio del settore

2.1. Il quadro di riferimento del trasporto aereo

Dopo un biennio di contrazione dei volumi di trasporto aereo di persone e di merci dovuto agli effetti della crisi economica propagatasi a livello mondiale, in Europa

[1] L'analisi è stata condotta prendendo come riferimento nazionale lo scalo di Roma Fiumicino.

nel 2010 si è registrata una crescita del traffico passeggeri e merci, rispettivamente del 4,2 e del 18,7 per cento, confermata anche nel 2011 (+7,3 per cento traffico passeggeri; +1,4 per cento traffico merci; si veda ACI Europe, 2011, 2012).

Per quanto riguarda l'Italia, sulla base dei dati comunicati da Assaeroporti attraverso il proprio sito internet, il 2009 ha fatto segnare un decremento complessivo del 2,3 per cento del traffico passeggeri (performance migliore di quella europea grazie a un recupero più tempestivo registrato negli ultimi tre mesi dell'anno), mentre è stato particolarmente negativo l'andamento del cargo (-15 per cento). Il 2010, al contrario, ha fatto registrare rispetto all'anno precedente un aumento del 7 per cento del traffico passeggeri (in crescita anche rispetto al dato 2007) e del 18 per cento del traffico merci. Stesso *trend* nel 2011, anno in cui il traffico passeggeri è cresciuto del 6,4 per cento e quello merci del 2,3 per cento.

Va evidenziato che la contrazione del mercato del trasporto aereo registrata nel biennio 2008-2009 fa seguito a un periodo di straordinaria crescita dello stesso. Come sottolineato da EUROSTAT[2], a partire dall'anno 2002 (una volta scontati, dunque, gli effetti negativi derivanti dagli attentati dell'11 settembre 2001) il numero di passeggeri ha conosciuto una crescita progressiva e robusta fino al 2007 e una sostanziale stabilità tra il 2007 e il 2008 (quando gli effetti della crisi hanno cominciato a propagarsi). Il numero di viaggiatori in aereo è passato, in Europa (a 27), dai circa 560 milioni nel 2002 ad oltre 700 milioni a partire dal 2005. Nel 2008, i passeggeri si sono attestati attorno a 804 milioni (sostanzialmente invariati rispetto al 2007) e nel 2010 hanno di poco superato i 786 milioni. Considerazioni analoghe valgono per il caso italiano. I dati ISTAT[3], che includono sia i servizi aerei interni e internazionali di linea sia i *charter*, mostrano che tra il 2003 e il 2008 si è avuto un incremento complessivo del traffico passeggeri nazionale pari al 33,35 per cento (a fronte di un numero di movimenti incrementatosi dell'11,95 per cento) e un aumento del traffico merci del 13,56 per cento. I passeggeri complessivi sono passati da poco meno di 100 milioni nel 2003 a quasi 133 milioni nel 2008, avendo raggiunto nel 2007 un livello di poco inferiore ai 135 milioni grazie a una crescita rispetto al 2006 a doppia cifra (+10,86 per cento). Come

[2] EUROSTAT, *Air passenger transport by reporting country [avia_paoc]*, ultimo aggiornamento 6 Marzo 2012, dati estratti in data 23 Marzo 2012.

[3] ISTAT, Trasporto Aereo 2003–2008, Tavole, aggiornamento 25 gennaio 2010.

anticipato, nel 2010 i passeggeri nazionali sono tornati a crescere, attestandosi poco al di sotto di quota 139 milioni (ENAC, 2011)

Proprio per la dinamica mostrata dal settore fino al 2008 e nonostante gli effetti negativi derivanti dalla pesante fase recessiva, nell'arco del prossimo ventennio la domanda di servizi di trasporto aereo è attesa praticamente ovunque in crescita. Per quanto previsioni a così lungo termine vadano prese con le dovute cautele, non si può ignorare che tutti gli scenari proposti, dai più ottimisti ai più conservativi, recano numeri impressionanti. Ad esempio, l'*Airports Council International* (ACI) nel *Global Traffic Forecast Report* 2008–2027 (ACI, 2009) prevede che a livello globale il numero di passeggeri passi dai 4,8 miliardi del 2008 a 11 miliardi nel 2027, sulla base di una crescita media annua – pari al 4,2 per cento – principalmente trainata dall'incremento di traffico sulle tratte internazionali. Prospettive altrettanto rosee si associano alla situazione europea, come si evince dalla lettura del *Long Term Forecast* pubblicato da *Eurocontrol* (*Eurocontrol,* 2010). In questo *report*, che focalizza la propria attenzione sul traffico europeo associato ai voli strumentali (vale a dire la quasi totalità del traffico commerciale) di pertinenza ESRA (*Eurocontrol Statistical Reference Area*), sono riportate previsioni basate su quattro scenari differenti, caratterizzati da diversi livelli di alcune variabili opportunamente selezionate. Sulla base di tali elaborazioni, al 2030 si prevede nell'ESRA un numero di movimenti compreso tra 13,1 e 20,9 milioni (a seconda dello scenario), cioè da 1,4 a 2,2 volte il traffico del 2009, il che implicherebbe tra i 500 e i 1.500 voli aggiuntivi al giorno e una crescita media annua del traffico inclusa nella forchetta 1,6–3,9 per cento. Nello scenario più probabile, sarebbe la Germania a beneficiare maggiormente di tali dinamiche (più di 5.000 voli aggiuntivi al 2030), seguita da Italia, Francia, Inghilterra e Turchia (tra 3.500 e 5.000 voli extra). Il *report* prosegue evidenziando che al 2030, alla luce delle previsioni di aumento del traffico e tenendo conto dei piani di investimento dichiarati dalle società di gestione aeroportuale e dai governi, c'è un rischio consistente che la capacità installata non sia sufficiente a soddisfare tutta la domanda. L'eccesso di domanda è stimato nell'ordine dei 5 milioni di movimenti nello scenario più ottimistico, che diventano 700.000 in quello più pessimistico, con la conseguenza che alcuni scali finirebbero per trovarsi in una situazione di elevata congestione.

2.2. Le necessità di riorganizzazione e di potenziamento del sistema aeroportuale italiano

A fronte di un simile quadro prospettico vi è una crescente e diffusa consapevolezza che la filiera del trasporto aereo debba essere interessata da profondi cambiamenti: da un lato i vettori devono avere la capacità strategica di sviluppare la propria offerta in modo da renderla maggiormente corrispondente all'evoluzione del sistema di preferenze degli utenti; dall'altro i sistemi aeroportuali vanno adeguatamente potenziati (sia sotto il profilo della capacità produttiva che della qualità dei servizi erogati). A questo proposito, è cruciale riflettere sul fatto che tali cambiamenti hanno tempistiche decisamente diverse. Mentre le compagnie aeree possono adeguare la propria struttura, le proprie strategie e la propria flotta con relativa tempestività, la modifica della capacità e della qualità dei sistemi aeroportuali richiede un orizzonte temporale ben più lungo. In assenza di misure efficaci e tempestive sul versante infrastrutturale, quindi, può facilmente accadere che mentre i vettori, evolvendosi, sollecitano la crescita della domanda di trasporto aereo, gli aeroporti finiscono per risultare un collo di bottiglia – perché ancorati a una dotazione infrastrutturale che non ha avuto il tempo di potenziarsi – con il rischio di limitare i molteplici benefici attesi associati allo sviluppo del settore[4].

Proprio tale circostanza spiega il perché, nonostante l'attuale situazione di difficoltà finanziarie ed economiche, da più parti sia rappresentata la necessità che il tema degli investimenti nel comparto aeroportuale sia affrontato con celerità.

In un simile quadro complessivo la realtà italiana presenta specificità tali da rendere, se possibile, la questione ancora più delicata. Infatti, il volume di risorse investite in Italia nel settore aeroportuale è finora stato non soltanto sistematicamente inferiore rispetto ai principali sistemi aeroportuali europei (ICCSAI, nel *Fact Book* 2009, riporta che nel triennio 2005–2007 l'investimento medio per passeggero è stato nell'ordine dei 2,5 Euro a fronte di una media

[4]ACI Europe (2010) sottolinea come gli aeroporti non soltanto supportano l'attività economica locale, ma spesso finiscono per definirla. L'aeroporto di Parigi (Charles de Gaulle) è responsabile di circa 90.000 posti di lavoro direttamente e di quasi 270.000 nel bacino di riferimento; il governo olandese stima che l'aeroporto di Amsterdam (Schiphol) rappresenta circa il 2 per cento del PIL, con una previsione del 2,8 per cento nel 2015; l'aeroporto di Monaco costituisce un catalizzatore di altre attività economiche al punto che ogni 18 giorni una nuova impresa si localizza nelle vicinanze (peraltro, ogni giorno questo aeroporto genera 4 nuovi posti di lavoro diretti e indiretti).

europea di 12 Euro), ma anche destinato alla proliferazione degli scali piuttosto che al potenziamento di quelli già esistenti. Per di più, come lucidamente osservato nell'ambito dell'indagine conoscitiva promossa nel 2010 dalla IX Commissione della Camera dei Deputati (d'ora in avanti Indagine Conoscitiva), il settore nel nostro Paese si è sviluppato per effetto di spinte autonome in assenza di una programmazione nazionale capace di individuare una strategia coerente di sviluppo.

Così, il sistema aeroportuale nazionale annovera al proprio interno circa 100 scali, soltanto 46 dei quali utilizzati per traffico commerciale con voli di linea. Sulla base dei dati più recenti resi disponibili da ENAC (2011, riferiti al 2010), i primi 20 scali ospitano il 93,5 per cento del traffico passeggeri, mentre gli 8 aeroporti a rilevanza comunitaria[5] insieme a Palermo e Roma Ciampino coprono più del 74,6 per cento del traffico passeggeri. Come sottolineato anche nell'Indagine Conoscitiva, nonostante l'Italia abbia dimensioni economiche paragonabili a quelle della Francia, della Germania e del Regno Unito, il traffico aereo risulta essere sostanzialmente inferiore a quello di questi Paesi. Peraltro, nel 2010 l'aeroporto più grande, Roma Fiumicino, ha totalizzato un numero di passeggeri (circa 36 milioni) di gran lunga più basso rispetto a Londra Heathrow (quasi 66 milioni), Francoforte (53 milioni) e Parigi Charles de Gaulle (58 milioni) (ICCSAI, 2011).

Anche il volume del trasporto aereo delle merci appare estremamente limitato nel nostro Paese, nonostante le enormi potenzialità derivanti dalla posizione strategica che l'Italia vanta nell'area mediterranea. Nel 2010 (ICCSAI, 2011) il mercato cargo nazionale in termini di tonnellate di merce trasportate (circa 882.000 t, quasi la metà delle quali coperte dall'aeroporto di Milano Malpensa secondo i dati ENAC 2011) ha mostrato dimensioni inferiori alla metà di quello francese (circa 2.084.000 t), pari a circa un terzo di quello del Regno Unito (circa 2.319.000 t) e poco più di un quinto di quello tedesco (circa 4.178.000 t).

I dati finora esposti si prestano a una doppia riflessione preliminare. Da un lato appare chiaro che l'Italia abbia ancora di fronte opportunità di sviluppo del settore ragguardevoli, dall'altro che le cause che hanno portato il sistema italiano a essere

[5] Vale a dire quelli con traffico superiore ai 5 milioni di passeggeri. Si tratta degli scali di: Roma Fiumicino, Milano Malpensa, Milano Linate, Venezia Tessera, Bergamo Orio al Serio, Catania Fontanarossa, Napoli Capodichino e Bologna Marconi.

relativamente involuto rispetto ai principali Paesi europei devono essere attentamente analizzate e tempestivamente rimosse.

2.3. Le criticità del sistema aeroportuale italiano

Semplificando radicalmente, molte delle ragioni dell'attuale atrofia del sistema aeroportuale italiano sono riconducibili a livelli e a decisioni di investimento non sempre adeguati, sostanzialmente a causa di due ordini di criticità: l'approccio e le scelte (mancate) di regolamentazione economica; l'assenza di una visione di politica industriale sistemica.

Il passaggio dallo Stato Gestore allo Stato Regolatore (La Spina e Majone 2000) ha costituito un cambiamento radicale del modello di intervento pubblico nell'economia. Il paradigma privatizzazioni/liberalizzazioni/regolamentazione che è stato applicato, con modalità e tempi diversi, ai settori a rete precedentemente serviti da monopolisti pubblici rappresenta la traduzione operativa di una filosofia per la quale lo Stato deve favorire il raggiungimento degli obiettivi di politica economica non attraverso un impegno diretto di risorse pubbliche, ma disegnando regole tese a orientare la libera interazione dei soggetti economici verso gli obiettivi ritenuti collettivamente rilevanti. Il modello di intervento dello Stato regolatore, dunque, dovrebbe articolarsi in due direttrici inestricabilmente legate l'una all'altra. Da un lato è necessario porsi obiettivi di sviluppo generali e settoriali, frutto di scelte di natura politica – e per questo è indispensabile che si dia luogo a una pianificazione figlia di una visione sistemica e di lungo periodo – dall'altro occorre specificare gli strumenti mediante i quali tali obiettivi possano essere perseguiti efficacemente – vale a dire disegnare regole tali da creare uno schema di incentivi economici per gli operatori coerente con il raggiungimento dello scopo finale.

Quando tale modello deve essere applicato a settori tecnologicamente maturi e con domanda relativamente stabile, l'aspetto pianificatorio diventa marginale e quello regolatorio può essere sostanzialmente semplificato: lo schema di incentivi deve essere disegnato in modo da massimizzare l'efficienza statica, inducendo gli operatori a praticare prezzi più bassi (strettamente orientati ai costi) e a ottenere una remunerazione del capitale investito non superiore a quella considerata "normale". In entrambi i casi è tipicamente sufficiente garantire la libertà di entrata di potenziali concorrenti (laddove possibile) o prevedere misure di regolamentazione dei prezzi.

Nel caso di settori dinamici e in espansione, invece, il tema degli investimenti diventa cruciale: occorre, quindi, disegnare regole che incentivino gli operatori a investire e a farlo in modo coerente con l'ottenimento degli effetti auspicati sul sistema socioeconomico. In tali circostanze, l'assenza di un'adeguata pianificazione a monte rischia di produrre risultati indesiderati (ad esempio, alcuni operatori investono troppo, altri troppo poco rispetto a quanto ritenuto utile ai fini del raggiungimento degli obiettivi politicamente stabiliti), mentre un sistema di regole tarato sulla massimizzazione dell'efficienza statica avrebbe la conseguenza di non consentire agli operatori di generare risorse sufficienti a sostenere il potenziamento infrastrutturale.

Ciò premesso, come detto, il settore aeroportuale italiano presenta da lungo tempo peculiari criticità in ordine al tema degli investimenti.

Il grosso degli investimenti infrastrutturali è stato storicamente finanziato, anche dopo la liberalizzazione del settore, attraverso il ricorso a risorse esterne alle gestioni aeroportuali e di provenienza essenzialmente pubblica. Solo qualche anno fa (nel dicembre del 2005), la Corte dei Conti in un'indagine scriveva: "*lo stato di realizzazione della riforma che doveva portare alla piena ed efficace operatività di società autonome per la gestione aeroportuale e al ridimensionamento – se non proprio alla cessazione – degli interventi finanziari statali per la realizzazione delle infrastrutture risulta [...] a distanza di oltre dieci anni, tuttora parziale e tale da non aver ancora realizzato quel processo di trasformazione e adeguamento delle funzioni e dei servizi alle mutate esigenze del settore, da realizzarsi anche con l'adozione di un nuovo modello giuridico – economico fondato sul carattere imprenditoriale dell'attività, in linea con il processo di liberalizzazione dei servizi del trasporto aereo*" (Corte dei Conti, 2005; p. 65).

Queste valutazioni (la cui validità sopravvive anche oggi per molti scali) e in particolare la circostanza di investimenti finanziati prevalentemente con risorse pubbliche – il cui volume è stato peraltro anche prima del 2005 esiguo rispetto a sistemi aeroportuali di altri Paesi[6] – vanno però adeguatamente contestualizzate.

[6] Infatti, al di là dei dati già citati e riferiti al triennio 2005–2007 (si veda il paragrafo 2.2, *supra*), anche in epoca precedente il differenziale di investimenti tra Italia e altre nazioni europee ha fatto registrare valori significativi. Secondo quanto riporta Clò (2004), citando uno studio della Morgan Stanley Research, gli investimenti in corso e programmati in Italia nel 2004 ammontavano complessivamente a 2 miliardi di Euro, vale a dire meno di quanto previsto in progetti di espansione presentati da singoli aeroporti stranieri (Francoforte, con 3,3 miliardi; Heathrow, con 5,4 miliardi; Berlino con 3,4 miliardi e così via).

Ai gestori aeroportuali, nelle more dell'applicazione della regolamentazione economica prevista prima nella Delibera CIPE 86/2000 e poi nella legge 248/2005 e nella connessa Delibera CIPE 38/2007 (in conformità della quale sono stati approvati finora solo cinque Contratti di Programma, relativi agli scali di Napoli, di Pisa, di Bari, di Brindisi e di Bologna[7]), sono stati riconosciuti, a prescindere da considerazioni di natura economica[8], diritti aeroportuali sistematicamente inferiori alla media europea. L'analisi di *benchmarking* tariffario, cui si rimanda per approfondimenti (si veda il paragrafo 3, *infra*), dimostra che i corrispettivi aeroportuali applicati nello scalo di Roma Fiumicino risultano sensibilmente inferiori rispetto a quelli di altri aeroporti europei e mondiali analoghi per vocazione e importanza. In particolare, si mostra come in riferimento all'anno 2008 le tariffe dello scalo romano siano tra il 25 e il 32 per cento[9] inferiori rispetto a quelle praticate negli aeroporti internazionali con cui Fiumicino è collegato; la forchetta diventa 39–45 per cento quando si fa riferimento solo agli aeroporti comunitari, mentre passa a 33–41 per cento quando si considerano i maggiori aeroporti in ciascun Paese dell'UE-15 (Italia esclusa). Sotto il profilo qualitativo si confermano così le risultanze emerse in altri lavori: lo studio Certet in Assaeroporti (2006) mostrava, ad esempio, che a seconda dell'aeromobile considerato le tariffe aeroportuali in Italia erano nel 2006 tra il 19 e il 49 per cento al di sotto della media europea.

2.4. I principali nodi critici

Il problema della liberalizzazione e della regolamentazione del settore dei servizi aeroportuali è stato a lungo dibattuto in letteratura, in modo particolare in Italia dove il susseguirsi nel tempo di interventi regolatori ha sollecitato a più riprese l'attenzione degli studiosi.

Già prima dell'approvazione della Delibera CIPE 86/2000, le esperienze estere avevano chiarito il funzionamento dei principali strumenti a disposizione del

[7] Si veda il sito *web* ENAC: http://www.enac.gov.it/La_Regolazione_Economica/Aeroporti/Contratti_di_Programma/Stipulati/index.html (visitato in data 29 marzo 2012).

[8] C'è anzi un tacito consenso tra le società di gestione sul fatto che le tariffe aeroportuali siano state tenute volontariamente a un livello contenuto nell'interesse di quella che allora era la compagnia di bandiera.

[9] La forchetta fa riferimento alla tipologia di corrispettivi inclusi nell'analisi. Il livello inferiore si riferisce ai totali 1 (atterraggio e decollo, passeggero, sicurezza, parcheggio e *reduced mobility*), il livello superiore si riferisce ai totali 2 (che includono ulteriori compensi lato aria previsti negli scali esteri). Si rimanda al paragrafo 3 (*infra*) per approfondimenti.

regolatore e i potenziali rischi che discendevano da un cattivo uso degli stessi (Ponti, 2000). Dopo l'intervento del CIPE era opinione diffusa che i *policy-maker* nazionali avessero regolato il settore aeroportuale "*con scarsa cognizione di causa e con scarsa o nulla aderenza alla realtà delle cose*" (Clò, 2004; p.468) e che la forte incertezza connessa all'allora vigente assetto regolatorio avrebbe disincentivato o addirittura reso impossibile la realizzazione di investimenti da parte delle società di gestione. La ragione di un situazione di questo tipo poteva essere individuata nell'inadeguatezza dell'azione pubblica e nella totale assenza di un quadro strategico di politica industriale e regolatoria. De facto si registrava la mancata applicazione della Delibera CIPE 86/2000, ostacolata da un lato dall'ostruzionismo dei gestori aeroportuali e dall'altro dall'emersione di nuove problematiche (in particolare la progressiva privatizzazione delle società di gestione) di fronte alle quali lo Stato si presentava del tutto impreparato (Sebastiani, 2004). Il dibattito si accendeva nuovamente a seguito dell'approvazione della legge 248/2005 sui "requisiti di sistema". Di fronte a tariffe aeroportuali fissate dal Ministero dei Trasporti mediante decreti con valenza provvisoria, e dunque in maniera discrezionale e poco trasparente, questa legge sembrava costituire un'occasione concreta per una regolazione equilibrata del rapporto tra vettori/passeggeri e aeroporti poiché semplificava la disciplina previgente, eliminando consuetudini non giustificabili e introducendo meccanismi di penalizzazione per i gestori inadempienti (Alderighi e Baccelli, 2006). Permaneva, tuttavia, l'assenza di un'adeguata "visione d'insieme" di politica industriale con riguardo al tema degli investimenti nelle infrastrutture aeroportuali (Barone e Bentivogli, 2006). La Delibera CIPE 38/2007, la cui attuazione dipendeva dall'emanazione di linee guida ENAC, era ispirata proprio alla legge sui "requisiti di sistema" e aveva il compito di risollevare il processo regolatorio dalla situazione di stasi in cui giaceva da anni, mettendo fine "*all'impunita disapplicazione di ogni prescrizione normativa precedente*" (Formica, 2007; p.311). Situazione quest'ultima che sembrava aggravata proprio dall'introduzione della legge 248/2005, la quale aveva avuto l'effetto di interrompere tutte le istruttorie per i Contratti di Programma già avviate. A complicare il quadro normativo e ad accentuare la discontinuità con le precedenti Delibere CIPE contribuiva, tuttavia, la successiva deroga alle norme vigenti introdotta con l'art. 17, comma 34-bis del d.l. 78/2009: si correva così un rischio concreto di sovrapposizione normativa e di conseguente proliferazione di Contratti di Programma e di contenziosi.

A valle di questa ricostruzione, appare dunque ancora del tutto attuale l'urgenza di "*pervenire a una normativa di sistema che riconduca la regolazione tariffaria a una*

razionalità comune" (Sebastiani, 2009; p.33). Restano almeno due, infatti, i principali nodi critici: la perdurante assenza di un piano nazionale che offra una necessaria "visione d'insieme" dell'intero sistema aeroportuale e fornisca indirizzi strategici di politica industriale e infrastrutturale, con effetti quindi penalizzanti in termini di investimenti realizzati; la persistenza di un impianto regolatorio incerto e in gran parte inattuato, che si traduce anche nella mancanza di trasparenza per quanto attiene alle tariffe aeroportuali (Sciandra, 2009).

Da questa prospettiva, il Capo II del Decreto Liberalizzazioni, che dà attuazione alla direttiva 2009/12/CE (già recepita con la legge n. 96/2010), sembra offrire una risposta adeguata, almeno sulla carta. Il legislatore, infatti, introduce un meccanismo di *regulation by negotiation* basato sull'obbligo di consultazione tra gestori e utenti dell'aeroporto per la determinazione dei diritti aeroportuali, previa selezione di un modello tariffario tra quelli predisposti dalla futura "Autorità dei Trasporti"[10] (art. 76). Questo intervento può potenzialmente semplificare e rendere più flessibile l'approccio regolamentare. Viene poi fatto esplicito riferimento alla necessità di incentivare gli investimenti nell'ambito di una crescita bilanciata della capacità aeroportuale (art. 71.3). In tal senso, sono state gettate le basi per un nuovo approccio volto a favorire l'equilibrato sviluppo delle infrastrutture aeroportuali. Resta, tuttavia, l'evidenza che si tratta pur sempre dell'ennesimo tassello all'interno del complesso *puzzle* di leggi nazionali, la cui effettiva applicazione viene nuovamente ritardata.

In sintesi, al di là delle singole misure regolatorie, qualora si intenda promuovere l'indispensabile potenziamento delle infrastrutture aeroportuali, le criticità alle quali è necessario porre rimedio sono, nel caso italiano, chiaramente identificabili: occorre maggiore stabilità del quadro regolatorio, una regolamentazione economica coerente con l'obiettivo di favorire gli investimenti e l'adozione di una visione sistemica del trasporto nazionale.

2.4.1. Stabilità del quadro regolatorio

Alla luce del Decreto Liberalizzazioni, è cruciale che si apra una nuova stagione di regolazione del settore aeroportuale, che faccia della stabilità, della chiarezza e della snellezza (sia del quadro di regole che delle procedure) tre dei propri

[10] Il Capo II del Decreto Liberalizzazioni fa riferimento a un'Autorità nazionale di sorveglianza (art. 73) le cui funzioni verranno svolte pro-tempore dal Ministero delle Infrastrutture e dei Trasporti, in attesa della piena operatività dell'Autorità dei Traporti (art. 36).

connotati peculiari. Non è pensabile, e in effetti il passato lo conferma[11], che i gestori aeroportuali intraprendano progetti di investimento cospicui nell'ambito di un quadro regolatorio incerto, né che il procedimento per l'approvazione dei Contratti di Programma possa durare indefinitamente (come ad esempio nel caso del Contratto di Programma degli Aeroporti di Puglia, il cui completamento della procedura ha richiesto oltre 2 anni).

2.4.2. Regolamentazione e investimenti

In secondo luogo, per tentare di risolvere il problema del potenziamento infrastrutturale la regolamentazione deve essere concepita in modo tale da indurre gli operatori 1) a generare (temporaneamente) risorse aggiuntive da destinare agli investimenti; 2) a investire il volume di risorse generate.

Consentire la generazione di risorse aggiuntive da destinare agli investimenti

Soprattutto in una fase di difficoltà economiche come quella attuale, le misure regolatorie che precedono il Decreto Liberalizzazioni sono problematiche poiché non mettono i gestori aeroportuali nelle condizioni di sostenere finanziariamente piani di investimento ingenti. La legge 248/2005 (che detta i principi cui è ispirata la successi Delibera CIPE 38/2007) prevede, ad esempio, che il recupero degli esborsi relativi a un investimento avvenga, attraverso l'adeguamento delle tariffe (strettamente orientate ai costi), solo a partire dal momento dell'entrata in esercizio delle nuove infrastrutture (secondo ciò che potremmo definire un'applicazione stringente del principio di "chi usa paga"). Con un simile schema regolatorio, per forza di cose, si producono tensioni finanziarie tali da far desistere gli operatori dall'investire, a meno che agli stessi non sia parallelamente consentito di generare altrimenti, ad esempio nell'ambito di altre attività non sottoposte a regolamentazione economica, risorse sufficienti.

La stessa legge 248/2005, tuttavia, contingenta anche quest'ultimo canale poiché prevede l'applicazione di un meccanismo di *mixed till* (detto anche di "*single till* parziale"), in ottemperanza al quale nella determinazione delle tariffe aeroportuali

[11] Uno dei motivi per i quali la Delibera 86/2000 non è stata mai concretamente applicata è stato che a partire dalla sua approvazione, i soggetti a vario titolo interessati al processo di determinazione delle tariffe hanno dibattuto sui criteri di implementazione, il cui utilizzo era ritenuto eccessivamente complicato, senza addivenire a soluzioni condivise. Tra le questioni più spinose c'era il riconoscimento, a fini regolatori, del valore delle opere finanziate dallo Stato nel capitale investito dei gestori privatizzati.

si deve tenere conto, detraendolo dai costi riconosciuti in tariffa, del 50 per cento del margine ottenuto sulle attività commerciali[12].

In sostanza, la scelta del regolatore italiano di imporre allo stesso tempo una stretta applicazione del principio del "chi usa paga" e del regime di *single till* appare fondata più su motivazioni ideologiche (il perseguimento della massima efficienza allocativa statica) che tecniche e finisce per ingessare la capacità dei gestori aeroportuali di generare risorse da destinare agli investimenti[13].

Peraltro, esiste una copiosa letteratura scientifica nella quale si dimostra la preferibilità (anche sotto il profilo dell'efficienza statica) – soprattutto quando si deve dare risposta a un problema di investimenti in capacità – del *dual till* (meccanismo secondo il quale sono prese in considerazione ai fini regolatori solo le cosiddette attività *aviation*) rispetto alle diverse forme di *single till*. Formica (2007) mostra come un regime di *single till*, costituendo di fatto un sistema di sussidio incrociato tra attività, generi segnali di prezzo inappropriati che portano a comportamenti non efficienti degli utenti e degli stessi operatori (di opinione contraria Czerny, 2006). Inoltre, la CAA (2000) sottolinea che il meccanismo di *single till* non riduce l'inefficienza allocativa connessa con lo sfruttamento della posizione monopolistica del gestore aeroportuale nelle attività commerciali, ma semplicemente impone la destinazione degli extraprofitti generati. Oum, Zhang e Zhang (2004) sostengono che con il meccanismo di *price cap* i gestori aeroportuali hanno in generale un incentivo a sotto-investire, ma dimostrano che il problema dell'*underinvestment* è più marcato nel caso del *single till* rispetto al *dual till*.

Preservare l'incentivo a investire

Va in ultimo sottolineato che, anche qualora i gestori aeroportuali disponessero di risorse sufficienti per il potenziamento delle proprie infrastrutture, ciò non

[12] Per la precisione, l'art. 11-nonies della legge 248/2005 dispone che per la determinazione delle tariffe bisogna tenere conto "*di una quota non inferiore al 50 per cento del margine conseguito dal gestore aeroportuale in relazione allo svolgimento nell'ambito del sedime aeroportuale di attività non regolamentate*". In teoria, quindi, il dettato normativo sarebbe compatibile anche con un modello di *single till* puro. Tuttavia, la Delibera CIPE 38/2007 ha disposto che la quota del margine commerciale da portare in detrazione fosse pari proprio al 50 per cento, configurando così un "*single till* parziale" (o anche *mixed till*).

[13] A questo proposito, giova osservare che il Regno Unito è uno dei Paesi nei quali il regime del *single till* è applicato (è per la verità in corso una valutazione circa l'opportunità di passare al *dual till*), ma il sistema regolatorio permette la pratica del prefinanziamento dei progetti di investimento (*pre-funding*). Ciò testimonia che i due strumenti – *single till* e stretta applicazione del principio del "chi usa paga" – devono ritenersi sostituti e non complementari.

implicherebbe automaticamente che esse sarebbero investite. Se sulla base della regolamentazione vigente gli operatori avessero la prospettiva di ottenere una remunerazione del capitale investito troppo bassa, ad esempio perché fosse riconosciuto in tariffa un premio per il rischio giudicato insufficiente, evidentemente non avrebbero incentivo a investire.

2.4.3. La necessità di una visione sistemica del trasporto

Si è già avuto modo di fare cenno al fatto che lo sviluppo degli aeroporti sia avvenuto in Italia in totale assenza di coordinamento. La proliferazione, oltre ogni ragionevole necessità, del numero degli scali che ne è derivata ha comportato una dispersione di risorse con effetti complessivamente negativi. Tali risorse, infatti, sono state utilizzate, invece che dove necessario per il potenziamento delle infrastrutture (lato aria, lato terra e di collegamento intermodale), per costituire aeroporti che – privi di un bacino di utenza adeguato – non hanno portato alcun beneficio tangibile al territorio di riferimento. Anzi, la proliferazione degli scali minori ha talvolta innescato fenomeni di cannibalismo, riducendo le possibilità di espansione di quelli già operanti nello stesso bacino di riferimento. Si è così finito per limitare, anziché espandere, la capacità di assorbimento del traffico aereo nel nostro Paese. In questo modo, peraltro, si è alimentata tra i gestori una rincorsa ad attirare, mediante agevolazioni e sostegni spesso poco trasparenti, le compagnie aeree (principalmente le *low cost*) senza le quali la loro sostenibilità economica e finanziaria sarebbe risultata impossibile: i successi repentini, ma di breve periodo, fatti registrare da alcuni scali sono stati determinati molto spesso dalle scelte strategiche anche di un solo vettore.

Per evitare che le risorse disponibili in futuro siano dissipate in troppi rivoli e abbiano perfino effetti controproducenti sul sistema Paese, è indispensabile che lo sviluppo del settore aeroportuale italiano avvenga sulla base di una pianificazione attenta, decisa dopo un'analisi approfondita delle potenzialità e delle possibili vocazioni degli scali esistenti, nonché delle esigenze dei territori nei quali insistono. Tale visione strategica, si badi, deve essere assecondata, e non limitata, dalla regolamentazione economica, che va pertanto concepita in modo flessibile sia sul piano dell'approccio che delle misure concretamente poste in essere: l'uno e le altre devono poter essere articolate caso per caso in funzione delle specificità e delle necessità dei singoli scali.

In un quadro più generale, assume importanza cruciale anche la capacità di coordinare la pianificazione del sistema nazionale dei trasporti con l'ampliamento degli aeroporti che si ritiene vadano potenziati. A questo proposito, tra i fattori che

pongono criticità in ordine allo sviluppo del sistema aeroportuale, l'Indagine Conoscitiva (p. 23) annovera la sostanziale mancanza di integrazione tra gli scali attualmente esistenti e le altre reti di trasporto (ferroviaria, metropolitana, stradale e autostradale): nessun aeroporto ha collegamenti di tipo metropolitano, soltanto 6 aeroporti hanno collegamenti con la rete ferroviaria e nessuno ha collegamenti con la rete ferroviaria ad alta velocità (soltanto 2, sulla base degli studi predisposti, potrebbero essere interconnessi).

Si noti che il problema dell'assenza di collegamenti intermodali è rilevante non soltanto nel caso del trasporto aereo passeggeri, ma anche, e forse a maggior ragione, in relazione al trasporto aereo delle merci. Infatti, affinché i servizi cargo possano integrarsi in un sistema logistico efficiente e capace di assicurare tempi di trasporto certi e contenuti occorre che non vi siano colli di bottiglia tra il sedime aeroportuale e le località di origine/destinazione delle merci.

In sostanza, perché il sistema aeroportuale diventi un'infrastruttura strategica all'interno del sistema Paese è necessario, quindi, recuperare una visione unitaria della pianificazione del trasporto (delle merci e delle persone), ma anche adottare un approccio regolatorio sufficientemente flessibile.

3. Le risorse finanziarie potenzialmente generate da un adeguamento tariffario: *benchmarking analysis* per l'aeroporto di Roma Fiumicino

3.1. La regolazione economica

In permanenza di un regime di *single till* l'unica strada possibile per effettuare investimenti ingenti, al di là dell'utilizzo di risorse pubbliche, appare quella del prefinanziamento (il cosiddetto *pre-funding*) delle opere. Questa pratica, ammessa anche dall'ICAO a certe condizioni[14], ha trovato e trova tuttora applicazione in diversi contesti internazionali. Ad esempio, negli Stati Uniti è applicato un corrispettivo, la cosiddetta *Passenger Facility Charge*, il cui introito è destinato allo sviluppo di progetti futuri; anche in Canada, alcuni aeroporti privatizzati, che non hanno più accesso a risorse pubbliche praticano una *Airport Improvement Fee*[15].

[14] Si veda ICAO (2009, punto 32).

[15] ACI Europe (2000; p.2) sottolineava, "the practice of controlled pre-financing is well established internationally. In the UK, in 1996, the Airports Regulator approved pre-financing at London Heathrow through five years of price rises three percent lower than consumer price inflation (CPI -3), followed by five years of CPI +2. Avoidance of pre-financing would have required five years of CPI -8, followed by CPI +13.5 annually. In the US, a passenger facility charge can be levied to pre-finance investment for up to five years before construction

Tale soluzione, ferma restando la necessità di approntare controlli e monitoraggi finalizzati a verificare che i gestori si impegnino effettivamente nel realizzare gli investimenti, avrebbe anche il pregio di rendere più uniforme l'evoluzione temporale delle tariffe – altrimenti soggette a incrementi significativi dal momento di entrata in esercizio dell'infrastruttura di nuova costruzione – e di consentire la verifica preliminare dell'esistenza di un'adeguata disponibilità a pagare da parte degli utenti. Nel valutare l'opportunità di utilizzare schemi di *pre-funding*, peraltro, vanno debitamente considerati anche gli effetti redistributivi che le tariffe aeroportuali possono avere tra Paesi. Gli aeroporti internazionali che utilizzano forme di *pre-funding* di fatto drenano una certa quota delle risorse dall'estero, assunto che gli utenti (passeggeri e vettori) stranieri costituiscono una porzione tipicamente cospicua del totale (in particolare nei grandi *hub* internazionali). La scelta di finanziare eventuali nuove infrastrutture aeroportuali ricorrendo alla fiscalità generale oppure attraverso forme di *pre-funding* interessa, quindi, soggetti diversi e ha di conseguenza effetti redistributivi non sovrapponibili che vanno opportunamente tenuti presenti.

Come emerge dalla *benchmarking analysis* di seguito sviluppata, il livello relativamente ridotto dei diritti aeroportuali correntemente praticati in Italia sembra lasciare ampi margini per sostenere agevolmente l'adozione di forme di *pre-funding*.

3.2. La *benchmarking analysis* internazionale, in condizioni di reciprocità tariffaria, per lo scalo di Roma Fiumicino

3.2.1. Nota introduttiva

Sulla base delle informazioni disponibili, si è deciso di incentrare l'analisi di *benchmarking* internazionale delle tariffe aeroportuali[16] esclusivamente sui voli commerciali offerti nell'aeroporto "Leonardo Da Vinci" di Roma Fiumicino (FCO), assumendo come riferimento temporale l'anno 2008[17] e focalizzando l'attenzione

starts. In Canada, passenger facility charges are also used at certain privatized airports which no longer have access to government funding".

[16] Per indicare le risorse finanziarie incassate dalle società di gestione aeroportuale, nel corso della trattazione si utilizzeranno alternativamente e indistintamente i termini tariffa, diritto, compenso e corrispettivo.

[17] Si è scelto di fare riferimento all'anno 2008 in modo da avere una fotografia recente, ma il meno possibile distorta dagli effetti della crisi economica e finanziaria (che ha infatti colpito il traffico passeggeri e merci solo negli ultimi mesi del 2008).

sui 116 collegamenti internazionali con traffico complessivo passeggeri superiore alle 20.000 unità.

In particolare, l'analisi è sviluppata attraverso l'implementazione di un modello di calcolo dei flussi finanziari generati dai collegamenti internazionali in condizioni di reciprocità tariffaria. In questo modo si intende:

- da un lato verificare se e in quale misura esistano dei differenziali tariffari tra lo scalo nazionale e quelli esteri e se sia confermata la circostanza evidenziata a più riprese (ad esempio nella Delibera CIPE 86/2000 e in Assaeroporti, 2006) di tariffe aeroportuali italiane significativamente inferiori a quelle vigenti in altri Paesi (europei e non);
- dall'altro quantificare le risorse aggiuntive che verrebbero generate da un riallineamento dei compensi nazionali alla media delle tariffe praticate all'estero.

3.2.2. La metodologia utilizzata

Le tariffe reciproche

Partendo dai flussi di passeggeri e aeromobili che nel 2008 hanno avuto come origine o destinazione l'aeroporto di Roma FCO, si procede all'operazione di *benchmarking*: si confronta il totale delle risorse incassate da Aeroporti di Roma[18] (AdR), sulla base delle tariffe lato aria allora vigenti, con quello che sarebbe stato altrimenti introitato se le tariffe lato aria fossero state, per ciascun collegamento, pari a quelle praticate nei singoli scali esteri di origine/destinazione della tratta. In questo modo si stima, in altre parole, quanto è stato raccolto nelle infrastrutture estere a parità di quantità e tipologia di movimentazioni.

Il monte risorse che risulta da un calcolo simile corrisponde concettualmente a quello che si incasserebbe utilizzando, per ciascuna tipologia di servizio considerato, una tariffa di riferimento composta dalla media delle tariffe praticate nei diversi aeroporti internazionali collegati, ponderate per il numero di passeggeri e di voli registrati su ciascuna tratta.

[18] Aeroporti di Roma S.p.A. è la concessionaria esclusiva per la gestione e lo sviluppo del Sistema aeroportuale della Capitale, costituito dall'aeroporto intercontinentale "Leonardo da Vinci" di Fiumicino e dal "Giovan Battista Pastine" di Ciampino.

Le informazioni disponibili e i dati necessari per l'analisi

La realizzazione dell'analisi di *benchmarking* conta sulla disponibilità di informazioni dettagliate circa le tariffe applicate nello scalo di Roma FCO per l'anno 2008, fornite direttamente da AdR, mentre per le tariffe aeroportuali internazionali è utilizzata la pubblicazione *IATA Airport, ATC and Fuel Charges Monitor* (IATA, 2008). L'analisi è complicata dal fatto che spesso gli aeroporti stranieri praticano corrispettivi disomogenei per natura, per base di calcolo e per destinazione degli incassi (tasse fissate nei diversi Stati[19], diritti aggiuntivi richiesti a vario titolo[20] a vettori e/o passeggeri, tariffe per l'uso delle infrastrutture centralizzate[21] e talvolta per i servizi di *handling*). Per tale ragione è indispensabile un lavoro di armonizzazione affinché il confronto internazionale sia significativo.

Nonostante le numerose informazioni raccolte e il notevole livello di dettaglio, è necessario introdurre, inoltre, alcune ipotesi semplificatrici (peraltro *standard* in questo tipo di analisi).

Le ipotesi introdotte

Considerando il traffico passeggeri generato dai collegamenti internazionali operati dall'aeroporto di Roma FCO, si ipotizza che:

- nessun passeggero sia in *transit*/*transfer* verso altre destinazioni;
- nessun passeggero sia esentato dal pagamento dei corrispettivi previsti[22];
- il numero dei passeggeri complessivamente registrato nella tratta sia equamente diviso tra partenze e arrivi[23].

Non si prendono in considerazione i proventi che discendono dall'erogazione dei servizi di *handling*[24]. La direttiva 96/67/CE del Consiglio dell'Unione Europea ha

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[19] Ad esempio la *airport development tax* greca oppure la *airport tax* francese.

[20] Ad esempio la *policy guard charge* dell'aeroporto di JFK New York oppure la *slot coordination charge* dell'aeroporto di VIE Vienna.

[21] Ad esempio per i pontili di imbarco e sbarco passeggeri (*loading/boarding bridge*), per i sistemi di smistamento e riconsegna bagagli (*Baggage Handling System* – BHS) oppure per la gestione sistemi informatici centralizzati (*Common User Terminal Equipment* - CUTE).

[22] I primi due punti dell'elenco equivalgono a dire che tutti i passeggeri siano "originanti paganti interi".

[23] Si ricorda infatti che lo scopo dell'analisi è quello di confrontare gli incassi degli aeroporti a parità di flusso di passeggeri.

[24] L'allegato A della direttiva 96/67/CE elenca i servizi che rientrano nella definizione di *handling* e sono quindi interessati dalla disciplina europea: assistenza amministrativa a terra e supervisione; assistenza passeggeri; assistenza bagagli; assistenza merci e posta; assistenza operazioni in pista; assistenza pulizia e servizi di scalo; assistenza carburante e olio; assistenza manutenzione dell'aereo; assistenza operazioni aeree e gestione degli

gettato, infatti, le basi per la liberalizzazione dei servizi di assistenza a terra negli aeroporti dell'Unione. Ciò significa: da un lato che l'*handling* è progressivamente svolto, in virtù dello sviluppo del processo di liberalizzazione avviato, in condizioni di concorrenza tra erogatori di servizi e dunque non necessariamente dal gestore aeroportuale; dall'altro che i relativi prezzi vengono quindi fissati dal mercato e non sono sottoposti a regolazione[25].

A causa dell'eccessiva arbitrarietà delle ipotesi che sarebbero necessarie per includerli nel conteggio, inoltre, non si considerano: le *lighting sucharge* (e le eventuali ulteriori maggiorazioni notturne previste); le *noise charge*; le *terminal navaid charge* (dal momento che non costituiscono introiti per i gestori aeroportuali, ma per le autorità competenti per la sicurezza della navigazione aerea); i corrispettivi per le infrastrutture centralizzate[26] (dal momento che non è possibile conoscere per ciascun volo l'effettivo utilizzo di tali infrastrutture).

Ulteriori ipotesi e accorgimenti adottati nell'implementazione dell'analisi si riferiscono:

- ai rari casi in cui le tariffe relative all'*handling*, all'illuminazione notturna oppure alla rumorosità, siano incluse nella *landing charge* o nella *passenger charge*, in tali circostanze si procede, ove possibile, allo scorporo dei relativi importi;
- ai casi in cui siano previste tariffe di picco e fuori dal picco, in questa situazione si calcola una tariffa media ponderata che tenga conto del numero di ore del giorno che rientrano nella definizione di picco e di quelle definite fuori dal picco;
- alla *parking charge*, per la quale si ipotizzano, in via semplificativa, 1 ora di sosta per i voli continentali e 3 ore di sosta per i voli intercontinentali.

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equipaggi; assistenza trasporto a terra; assistenza ristorazione (*catering*).

[25] Si ricorda che attualmente in Italia i servizi di assistenza a terra sono sottoposti a regolamentazione tariffaria solo se erogati di fatto in regime di esclusiva dalle singole società di gestione.

[26] Le infrastrutture centralizzate, che possono essere affidate in via esclusiva dall'ENAC al gestore aeroportuale, sono ricondotte, a titolo esemplificativo, a: gestione sistema di smistamento e riconsegna bagagli; gestione tecnica pontili per l'imbarco e lo sbarco dei passeggeri o altri sistemi non frazionabili di trasporto dei passeggeri; gestione impianti centralizzati di alimentazione, condizionamento e riscaldamento aeromobili; gestione sistemi centralizzati di sghiacciamento aeromobili; gestione sistemi informatici centralizzati (informativa al pubblico, sala annunci, sistema di scalo CUTE, etc.); gestione impianti statici centralizzati di distribuzione carburanti; gestione impianti centralizzati di stoccaggio e lavaggio materiali *catering*.

In generale, si privilegia una logica prudenziale cosicché le ipotesi e le modalità di calcolo adottate sono quelle, tra tutte le possibili, che minimizzano il differenziale tra il monte risorse a tariffe reciproche e quello a tariffe dello scalo di Fiumicino, in modo che la valutazione di *benchmarking* risulti la più cauta.

Un'ultima riflessione concerne le operazioni di conversione tariffaria necessarie per effettuare il confronto internazionale. Come noto, l'utilizzo del tasso di cambio per rendere omogenee grandezze espresse in valute differenti introduce alcune possibili distorsioni nelle comparazioni. Per tale ragione si ritiene opportuno proporre, per una serie di aeroporti selezionati, un confronto tra le tariffe basato sulla parità dei poteri d'acquisto, in modo da poter operare un'analisi sulla base della consistenza effettiva delle stesse in rapporto al potere d'acquisto degli utenti nelle diverse nazioni considerate.

Nel dettaglio, le tariffe espresse in valuta straniera sono convertite in Euro utilizzando:

- per i Paesi inclusi nell'elenco dell'*Organisation for Economic Co-operation and Development* (OECD), i tasso di cambio, riferiti al 2008, disponibili *online* nel *database* OECD[27];
- per i restanti Paesi, la media dei tassi di cambio giornalieri interbancari, registrati tra il 1° gennaio 2008 e il 31 dicembre dello stesso anno, disponibili *online* sul sito internet Oanda[28].

Il conteggio delle tariffe in termini di parità dei poteri d'acquisto (nel seguito PPP, dall'acronimo inglese *Purchasing Power Parities*) è effettuato per i primi 19 collegamenti esteri di origine/destinazione[29] (tralasciando Il Cairo[30]), ordinati sulla base del traffico passeggeri complessivo, utilizzando gli opportuni tassi di conversione, riferiti al 2008, disponibili *online* nel *database* OECD[31].

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[27] OECD.stat, *Dataset 4:PPP and exchange rates*, dati estratti in data 9 Gennaio 2010.

[28] Si veda Oanda (*Forex Trading and Exchange Rates Services*) all'indirizzo web: http://www.oanda.com, visitato in data 10 Gennaio 2010.

[29] Si considerano i seguenti scali: LHR London, AMS Amsterdam, BRU Brussels, ATH Athens, VIE Vienna, FRA Frankfurt, CDG Paris, PRG Prague, CPH Copenhagen, ZRH Zuerich, TLV Telaviv, MUC Munich, SVO Moscow, LIS Lisbon, IST Istanbul, BCN Barcelona, EWR Newark, MAD Madrid, JFK New York.

[30] Non è possibile effettuare questo conteggio per lo scalo di CAI Il Cairo, 19° per numero di passeggeri complessivamente trasportati, poiché l' OECD non fornisce tassi PPP per l'Egitto.

[31] Si veda la nota 27, *supra.*

Si sottolinea, infine, che, per rendere confrontabili i flussi finanziari, si procede alla stima delle risorse generate complessivamente per un approdo e un decollo, dal momento che in molti scali sono previsti corrispettivi, in alternativa, solo per l'approdo o per il decollo e solo per l'arrivo o per la partenza dei passeggeri, ma in altre realtà è fissato un unico corrispettivo per l'insieme dei due movimenti o corrispettivi differenti per ciascuno di essi.

3.2.3. I risultati della benchmarking analysis

Le risorse aggiuntive complessivamente generate

Sulla base dei dati a disposizione e delle ipotesi avanzate, emerge che, applicando tariffe reciproche per ogni tratta estera individuata, nel corso del 2008 nello scalo di Roma FCO sarebbero state generate complessivamente risorse aggiuntive (si veda la figura 1, *infra*) per:

- 45,8 milioni di Euro, considerando esclusivamente le tariffe per atterraggio e decollo, parcheggio, passeggero, sicurezza e *reduced mobility*[32] (d'ora in avanti totale 1);
- 65,4 milioni di Euro, considerando oltre alle tariffe incluse nel totale 1 anche gli altri corrispettivi previsti in alcuni aeroporti esteri di origine/destinazione (d'ora in avanti totale 2).

Includendo i soli collegamenti comunitari, le risorse aggiuntive generate nello stesso anno ammonterebbero a (si veda la figura 1, *infra*):

- 46,7 milioni di Euro, considerando il totale 1.
- 60 milioni di Euro, nel caso del totale 2.

A livello globale, le tariffe applicate in 68 aeroporti dei 116 considerati (il 59 per cento) generano un *gap* positivo in termini di flussi finanziari. A livello comunitario tale percentuale aumenta, poiché le tariffe di 42 aeroporti su 57 (il 74 per cento) generano risorse finanziarie aggiuntive[33].

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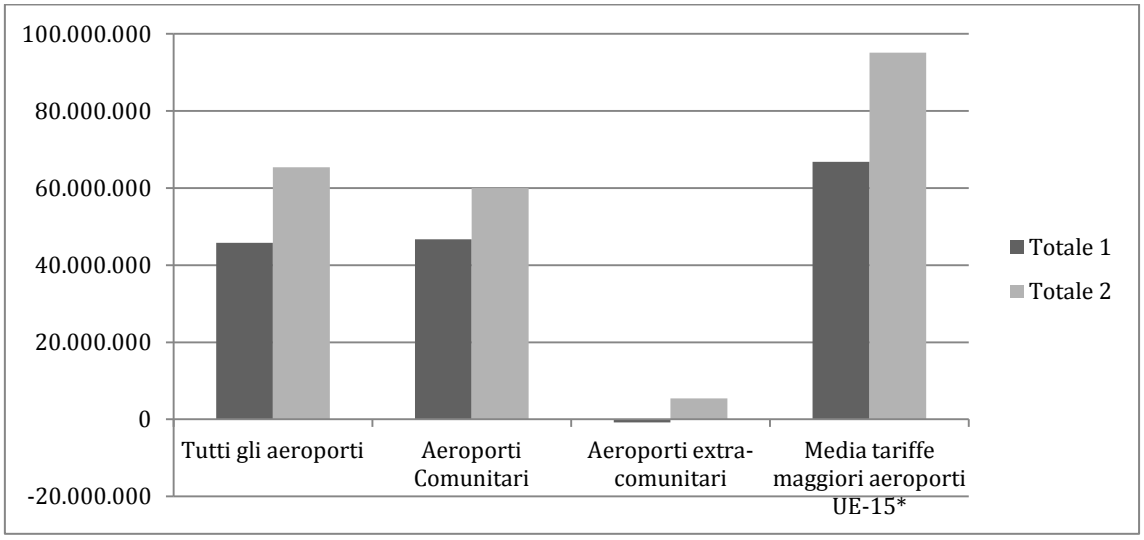
[32] La tariffa *Passenger Reduced Mobility (PRM)* è stata introdotta dai gestori aeroportuali comunitari sulla base del Regolamento (CE) n.1107/2006, che all'articolo 8 stabilisce di ripartire tra tutti gli utenti di un aeroporto i costi per l'assistenza da erogare alle persone con mobilità ridotta. Questo corrispettivo chiaramente è pari a zero in tutti gli scali extra-comunitari.

[33] Si fa riferimento alla differenza tra totali 1.

Va evidenziato che gli unici aeroporti comunitari, tra quelli rientranti nei collegamenti individuati, che raccolgono sulle tratte in questione risorse inferiori rispetto allo scalo di Roma FCO sono:

- le infrastrutture greche di RHO Rhodes, SKG Thessaloniki ed HER Heraklion;
- le infrastrutture francesi di TLS Toulouse e MRS Marseille;
- l'infrastruttura di LUX Luxembourg dello Stato del Lussemburgo;
- tutte le infrastrutture spagnole[34].

Figura 1. Le risorse aggiuntive complessivamente generate presso lo scalo di Roma FCO in condizioni di reciprocità tariffaria, valori in Euro, anno 2008



Note: Il totale 1 include le tariffe per atterraggio e decollo, parcheggio, passeggeri, sicurezza e *reduced mobility*; il totale 2 include anche le ulteriori tariffe lato aria previste negli scali esteri (si escludono in ogni caso la *lighting surcharge*, la *noise charge*, la *terminal navaid charge*, i compensi per le infrastrutture centralizzate e i compensi per l'*handling*); (*) nel totale 1 della media tariffe maggiori aeroporti UE-15 non è incluso il corrispettivo per la *reduced mobility*.

Esaminando, invece, tutti i collegamenti extra-comunitari, il differenziale di risorse finanziarie nel 2008 risulterebbe pari a (si veda la figura 1, *supra*):

- -0,8 milioni di Euro (totale 1);

[34] Tutti gli aeroporti spagnoli sono gestiti da un unico ente pubblico indipendente, *Aeropuertos Espanoles y Navegacion Aerea* (AENA), che fissa le tariffe aeroportuali a livello centralizzato, classificando gli scali in tre differenti categorie.

- 5,4 milioni di Euro (totale 2).

Un margine di risorse aggiuntive così ridotto va tuttavia interpretato avendo presente la particolare debolezza del Dollaro statunitense rispetto all'Euro registrata nel 2008[35]. Oltre a quelli degli USA, molti altri aeroporti extra-comunitari fissano, infatti, le proprie tariffe in tale valuta. Da un punto di vista numerico sono comunque 26 su 59 (il 44 per cento) gli scali che fanno registrare un *gap* tariffario positivo[36].

Qualora, infine, nell'aeroporto di Fiumicino si adottassero, per tutti i collegamenti internazionali effettuati, diritti aeroportuali pari alla media ponderata (per numero passeggeri e per numero di voli su ciascuna tratta) di quelli praticati nel maggiore aeroporto di ciascuno Stato dell'Unione Europea a 15[37] (escludendo, naturalmente, Roma FCO), si assisterebbe a una crescita delle risorse incassate pari a (si veda la figura 1, *supra*):

- 66,8 milioni di Euro, considerando il totale 1[38];
- 95,1 milioni di Euro, nel caso del totale 2.

Quest'ultimo dato assume particolare rilevanza alla luce del Capo II del Decreto Liberalizzazioni, che annovera tra i principi per la determinazione dei diritti aeroportuali l'orientamento "alla media europea dei diritti aeroportuali praticati in scali con analoghe caratteristiche infrastrutturali, di traffico e *standard* di servizio reso" (art 80.1).

Le caratteristiche della struttura tariffaria

Posta uguale a 100 la somma delle risorse complessivamente generate dalle tariffe per atterraggio e decollo, passeggero, sicurezza e parcheggio è possibile confrontare le differenze che emergono nella struttura tariffaria dall'applicazione da un lato delle tariffe dell'aeroporto di Roma FCO e dall'altro di tariffe reciproche.

Nella figura 2 (si veda *infra*) si considerano le risorse generate da tutti i collegamenti internazionali offerti dall'aeroporto di Roma FCO.

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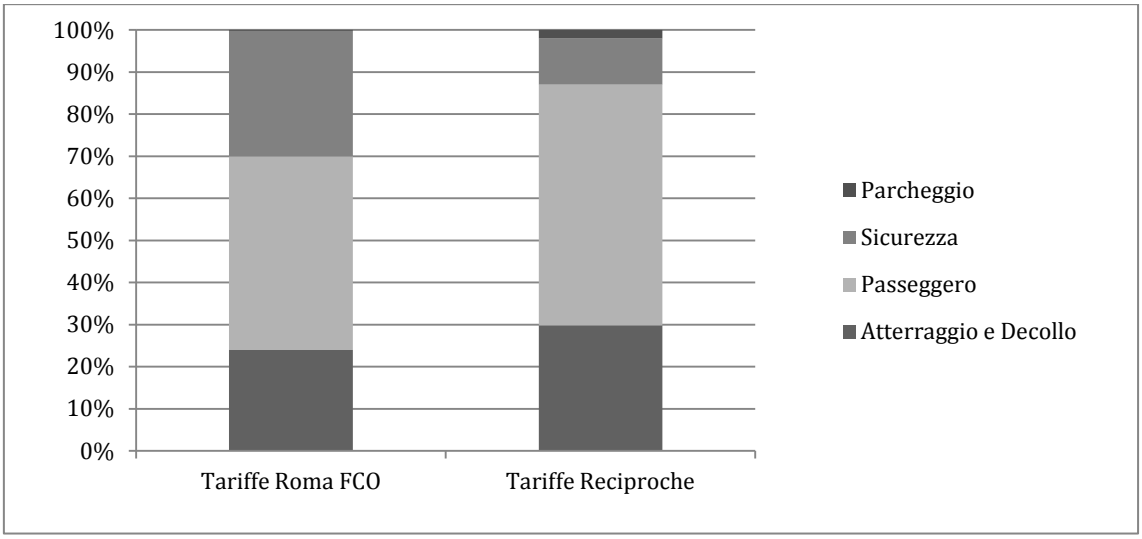
[35] Il tasso di cambio USD/EUR indicato dal *database* OECD per l'anno 2008 è pari a 0,682675.

[36] Si fa riferimento alla differenza tra totali 1.

[37] Si considerano i seguenti scali: CDG Paris, MAD Madrid, LHR London, AMS Amsterdam, FRA Frankfurt, ATH Athens, BRU Brussels, LIS Lisbon, VIE Vienna, CPH Copenhagen, HEL Helsinki, DUB Dublin, ARN Stockholm, LUX Luxembourg.

[38] In questo conteggio non si tiene conto della tariffa prevista per la PRM.

Figura 2. La struttura delle tariffe - distribuzione percentuale delle risorse generate dall'applicazione delle tariffe per atterraggio e decollo, passeggero, sicurezza e parcheggio (totale=100) su tutti i collegamenti internazionali offerti dall'aeroporto di Roma FCO nell'anno 2008, con traffico complessivo passeggeri superiore alle 20.000 unità.



Le tariffe atterraggio e decollo in condizioni di reciprocità tariffaria sono pari al 30 per cento del monte risorse, a fronte del 24 per cento sulla base delle tariffe di Fiumicino. Anche le tariffe passeggero pesano di più a tariffe reciproche (57 per cento contro 46 per cento). Per quanto attiene, invece, ai compensi per la sicurezza si assiste a un'inversione di tendenza: in reciprocità tariffaria sono pari all'11 per cento delle risorse, mentre con le tariffe dello scalo romano hanno un peso pari al 30 per cento del totale[39]. Le tariffe di parcheggio, infine, hanno un peso marginale, generando comunque il 2 per cento delle risorse sulla base delle tariffe praticate negli scali internazionali. Le differenze tra le strutture tariffarie restano pressoché invariate anche quando si prendono in considerazioni separatamente i soli collegamenti comunitari ed extra-comunitari.

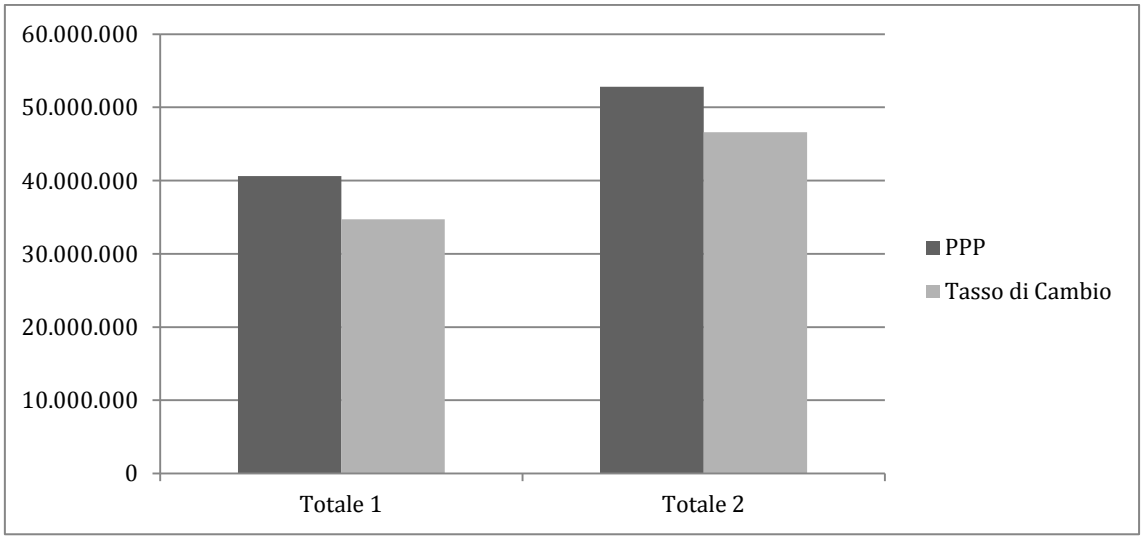
[39] È opportuno sottolineare come in alcuni aeroporti i corrispettivi per la sicurezza aeroportuale sono inclusi nelle tariffe passeggero. Ciò accade in particolare negli aeroporti di: HAM Hamburg, KUL Kuala Lumpur, MLE Male, BHX Birmingham, LGW London, LHR London, PRG Prague, DMA Damasco, GVA Geneva, BUD Budapest.

Le tariffe in Purchasing Power Parities (PPP)

Dall'implementazione della *benchmarking analysis* sui primi 19 collegamenti internazionali per traffico complessivo passeggeri offerti dall'aeroporto di Roma FCO nell'anno 2008, senza considerare il PPP, emerge che, applicando tariffe reciproche, verrebbero generate risorse aggiuntive (si veda la figura 3, *infra*) per:

- 34,7 milioni di Euro (totale 1);
- 46,6 milioni di Euro (totale 2).

Figura 3. Le risorse aggiuntive complessivamente generate dei primi 19 collegamenti internazionali offerti dallo scalo di Roma FCO, valori in Euro, anno 2008



Note: Il totale 1 include le tariffe per atterraggio e decollo, parcheggio, passeggeri, sicurezza e *reduced mobility*; il totale 2 include anche le ulteriori tariffe lato aria previste negli scali esteri (si escludono in ogni caso la *lighting surcharge*, la *noise charge*, la *terminal navaid charge*, i compensi per le infrastrutture centralizzate e i compensi per l'*handling*).

Utilizzando, invece, le tariffe convertite sulla base delle PPP, le risorse aggiuntive generate ammonterebbero a (si veda la figura 3, *supra*):

- 40,6 milioni di Euro (+17 per cento rispetto ai conteggi senza PPP, con riferimento al totale 1);
- 52,8 milioni di Euro (+13 per cento rispetto ai conteggi senza PPP, con riferimento al totale 2).

L'incremento del *gap* tra i totali fatto registrare dal conteggio delle tariffe in termini di parità dei poteri d'acquisto mostra come in termini reali le differenze tra introiti siano ancora più accentuate. In definitiva, l'analisi di *benchmarking* consente di

evidenziare non soltanto che l'Aeroporto di Roma Fiumicino disporrebbe di risorse aggiuntive se praticasse tariffe pari ad una media ponderata di quelle estere convertite in Euro con il semplice tasso di cambio, ma che tali risorse aggiuntive risulterebbero persino maggiori se l'Aeroporto romano praticasse tariffe che incidessero in termini reali sulla capacità di spesa degli italiani in modo analogo a quanto già avviene negli altri Paesi.

4. Alcune riflessioni conclusive

L'evoluzione del settore aeroportuale italiano necessita di una discontinuità netta rispetto al passato, senza la quale l'obiettivo di cogliere le opportunità socioeconomiche connesse con il notevole incremento di traffico atteso nei prossimi anni certamente non potrà essere conseguito. Da questa prospettiva, il Capo II del Decreto Liberalizzazioni (che ha dato attuazione alla direttiva comunitaria 2009/12/CE, già recepita con la legge n. 96/2010) sembra gettare le basi per una nuova stagione regolatoria.

Un primo elemento di cambiamento imprescindibile è la necessità di una pianificazione strategica del settore per una "crescita bilanciata della capacità aeroportuale" (art. 71.3, Decreto Liberalizzazioni), da inquadrare nell'ambito di un più generale ripensamento dell'assetto dei trasporti nazionali. Nel condurre tale attività di pianificazione, un criterio utile da adottare tra gli altri generalmente accettati (quali ad esempio gli impatti in termini di PIL e di occupazione) potrebbe essere quello di favorire la massima contiguità territoriale. Significative porzioni del territorio italiano, infatti, sono caratterizzate da molteplici difficoltà di collegamento su ferro e su gomma con inevitabili effetti negativi sulla capacità di spostamento di persone e merci. Va riconosciuto che questo problema, scontato per le isole, affligge anche molte aree meridionali che storicamente si presentano poco infrastrutturate e per l'innervamento delle quali sarebbero richiesti costi, in termini di volumi di risorse e di pianificazione e *governance* degli interventi, eccessivi rispetto ai benefici. Anche alla luce del numero elevato di aeroporti di cui il nostro Paese è dotato e della volontà, nei limiti del possibile, di valorizzare gli *asset* infrastrutturali già realizzati, si potrebbero individuare alcuni scali del Sud con i quali – attraverso un'opera di potenziamento della capacità e di adeguamento dei collegamenti intermodali, laddove necessario – formare una *network* di aeroporti che supplisca ai *deficit* esistenti. Si tratterebbe in questo caso di trovare una forma efficace di *governance* degli aeroporti inclusi nel *network*, capace cioè di realizzare nel modo più efficiente la necessaria opera di coordinamento (che coinvolge, evidentemente, non soltanto gli scali, ma anche i vettori e gli altri sistemi

di trasporto). Le "reti aeroportuali" di cui all'art. 74 del Decreto Liberalizzazioni, potrebbe essere disegnate proprio sulla base di queste considerazioni.

Una seconda dimensione del cambiamento riguarda gli aspetti di regolamentazione economica: si è già avuto modo di sottolineare come l'assetto attuale non sia coerente con l'obiettivo di agevolare gli investimenti. Dell'incentivazione degli investimenti dovrà inevitabilmente tener conto la futura "Autorità dei Trasporti", quando sarà chiamata a predisporre in concreto i modelli tariffari a disposizione dei gestori aeroportuali (art. 71.3, Decreto Liberalizzazioni).

Il punto va affrontato operando la seguente distinzione di massima. Da un lato esistono aeroporti di piccole dimensioni (con traffico annuo inferiore al milione di passeggeri) e con scarse possibilità di sviluppo, spesso in concorrenza tra loro e in oggettive difficoltà per la sopravvivenza nel lungo periodo. In questi casi, la necessità di sottoporre le attività di gestione a qualsiasi forma di regolamentazione economica (soprattutto quella relativa ai diritti aeroportuali) appare in linea di massima ingiustificata. Come già detto, questi scali sono in condizioni di dipendenza economica quasi assoluta nei confronti dei vettori aerei e non c'è ragione di allestire un quadro di regole – la cui applicazione e il cui controllo comportano comunque un costo per la collettività – per limitare un potere di mercato che nei fatti non sussiste. Sarebbe preferibile, piuttosto, procedere a una loro deregolamentazione, lasciando all'Autorità Garante della Concorrenza e del Mercato la sanzione dei comportamenti anticompetitivi eventualmente posti in essere.

Per quanto riguarda invece gli aeroporti che hanno necessità, attuale o prospettica, di potenziare le proprie infrastrutture si ritiene indispensabile un ritorno al modello del *dual till* oppure l'istituzione, mirata e limitata nel tempo, di possibilità di prefinanziamento. Con il ritorno al *dual till*, oltre a lasciare agli operatori una fonte di risorse libere, si attiverebbe un circolo virtuoso per il quale la prospettiva che i gestori hanno di realizzare extraprofitti attraverso le proprie attività commerciali li spinge a realizzare investimenti in capacità, poiché incrementando il traffico di passeggeri ottengono ulteriori extraprofitti. In questo caso la regolamentazione economica potrebbe limitarsi a imporre diritti aeroportuali orientati ai costi, se necessario (per promuovere gli investimenti) consentendo il recupero in tariffa degli esborsi per gli investimenti nel momento in cui vengono sostenuti e non quando le nuove infrastrutture diventano operative, sul modello storicamente seguito nella regolamentazione del settore autostradale. È chiaro però che qualora si decida di conservare l'attuale regime di *single till*,

l'introduzione di meccanismi di *pre-funding* risulta essere probabilmente la sola via di fatto percorribile per generare le risorse finanziarie indispensabili per la realizzazione dei necessari investimenti aeroportuali. Come evidenziato nella *benchmarking analysis* le tariffe dei servizi aeroportuali nazionali sono di gran lunga inferiori a quelle praticate nei principali scali esteri e negli aeroporti europei con caratteristiche analoghe: vi sono quindi consistenti margini per un adeguamento tariffario (in particolare dei compensi per l'atterraggio e il decollo e per i passeggeri, a giudicare dalla composizione della struttura tariffaria) in grado di generare consistenti risorse da destinare al prefinanziamento degli investimenti.

A ciò si aggiunga che esistono diversi motivi per ritenere che gli utenti dei servizi aeroportuali – siano essi cittadini, vettori di trasporto passeggeri o vettori di trasporto merci – sarebbero disposti a pagare tariffe aeroportuali più elevate se queste fossero utilizzate per finanziare servizi (lato aria, terra e di interconnessione intermodale) di qualità maggiore[40].

Il problema del potenziamento infrastrutturale nel settore aeroportuale negli ultimi anni è tornato più volte all'attenzione del Governo[41]. Nonostante sia stato

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[40] Un primo indizio di tale circostanza è rintracciabile nel testo dell'audizione, dell'ottobre 2009, resa dall'ENAC di fronte alla Commissione Trasporti della Camera (ENAC, 2009). Al punto IV del paragrafo 1.2, infatti, si legge "*dall'analisi dei comportamenti del 'fruitore del servizio' di trasporto aereo, si evince che il passeggero si lamenta molto più della qualità del servizio, piuttosto che del costo del servizio. Questo è un dato importantissimo; la recessione in atto ha fatto cogliere un segnale fondamentale: l'utilizzatore degli impianti aeroportuali rivendica una maggiore qualità, non denuncia o non attacca più di tanto il livello dei costi. In questa crisi generalizzata e globale, l'Italia e la Spagna, Paesi entrambi aventi le tariffe aeroportuali più basse, sono, ad esempio, i Paesi in cui il trasporto aereo ha sofferto di più la crisi. Intuitivamente avrebbe dovuto attendersi esattamente il contrario: tariffe molto alte avrebbero dovuto deprimere maggiormente la domanda di trasporto aereo. Invece Francia e Germania, che al contrario sono caratterizzate dalle tariffe più alte, hanno registrato una riduzione del numero dei passeggeri inferiore alla nostra*". Indicazioni analoghe sono state ottenute nell'ambito di una ricerca svolta dalla LUISS Business School per AICAI (AICAI & LBS, 2010). Dalle interviste ai vettori cargo, infatti, emerge chiaramente che gli operatori: 1) considerano la qualità dei servizi, e non il prezzo, come elemento determinante per le scelte logistiche; 2) sarebbero disposti a pagare diritti aeroportuali più elevati a fronte, ad esempio, di migliori connessioni intermodali.

[41] Si fa in particolare riferimento a due misure adottate dalla precedente legislatura. La prima – contenuta nell'art. 17, comma 34-bis, del decreto legge n. 78/2009 (convertito con legge n. 102/2009) – con la quale l'ENAC era autorizzato a stipulare contratti di programma, in deroga alla normativa vigente in materia, per gli scali con più di 10 milioni di passeggeri, "*introducendo sistemi di tariffazione pluriennale che, tenendo conto dei livelli e degli standard europei, siano orientati ai costi delle infrastrutture e dei servizi, a obiettivi di efficienza e a criteri di adeguata remunerazione degli investimenti e dei capitali, con modalità di aggiornamento valide per l'intera durata del rapporto*". La seconda – contenuta nell'articolo 2, commi 190-191, della legge finanziaria 2010 – con la quale si consentiva un'anticipazione tariffaria in favore delle società concessionarie dei servizi

apprezzabile il tentativo governativo di affrontare il problema degli investimenti superando il più in fretta possibile i limiti connessi con la regolamentazione vigente e con la situazione economica particolarmente critica, va registrato, ancora una volta, come tali interventi abbiano continuato a inquadrarsi in un contesto di "ordinaria emergenza". In definitiva, occorre invece procedere a un riassetto complessivo e definitivo del sistema aeroportuale italiano, per eliminare quella schizofrenia che ha finora prodotto i discutibili risultati descritti. L'auspicio è che la spinta offerta dal Capo II del Decreto Liberalizzazioni sia l'occasione non soltanto per procedere a una revisione organica della normativa nazionale in materia di diritti aeroportuali (come pure suggerito nell'Indagine Conoscitiva), ma anche per promuovere l'adozione di criteri e strumenti di pianificazione settoriale a tutti i livelli (dal singolo aeroporto all'intero territorio nazionale), in modo da garantire strutturalmente quel raccordo tra finalità e misure di politica economica indispensabile per il raggiungimento degli obiettivi ritenuti collettivamente rilevanti.

aeroportuali, nel limite massimo di tre euro a passeggero per l'imbarco su voli UE ed extra UE, a condizione che venissero effettuati nuovi investimenti infrastrutturali urgenti, in autofinanziamento, da parte dei gestori stessi.

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The role of the discount rate in cost-benefit analysis between theory and practice: a comparative survey*

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Keywords

Cost-Benefit Analysis, Impact Assessment, Intergenerational Discounting, Regulatory Impact Analysis, Social Discount Rate.

Abstract

This study focuses on the role of the discount rate in cost-benefit analysis (CBA) of regulation, providing a systematic investigation into regulatory practice vis-à-vis the existing economic theories. In the first part, a quick survey of the main economic literature on the social discount rate (SDR) is presented. In the second part, the current institutional practice is investigated, firstly comparing the recommendations on discounting issued by institutional actors in the US and the EU, and secondly examining the SDRs adopted in two samples of CBAs selected among Regulatory Impact Analyses of US Environmental Protection Agency and Impact Assessments of EU DG Environment. A gap exists between economic theory and institutional practice in the selection of the SDR. Regulatory decisions which are based on CBA reflect the most workable economic literature on discounting rather than the most theoretically consistent one. Scholars who aim at improving the quality of rule-making and at fostering the application of CBA in regulatory decisions should improve the "operational validity" of their research, thus providing practitioners with methods that are both consistent and workable.

1. Introduction

In the current institutional framework, cost-benefit analysis (CBA) is the most comprehensive method to carry out regulatory impact assessments[1]. Nonetheless, the theoretical debate on CBA still leaves open significant methodological problems to which scholars often suggest controversial solutions (Fraiberg and Trebilcock, 1998; Arcuri, 2012). Such a long-lasting academic discussion might result in a gap between the elaborated findings of "knowledge producers" (researchers) and the concrete needs of "knowledge users" (practitioners). Undoubtedly, this outcome should be avoided in the context of regulatory CBA, having in mind that workability is one of the main features of this method. Hence, the attempt to understand concretely how and to what extent the academic literature affects institutional actors' choices on CBA is a functional task that can provide evidence to improve future research.

Narrowing down so broad a research problem, this study focuses on the role of the discount rate in CBA of regulation, considering on the one hand the most well-established economic theories on discounting and on the other the current institutional practice. In a nutshell, by pointing out what academics argue in literature, what regulators suggest in official guidelines, and what is concretely done in CBA documents, the paper aims at investigating whether regulatory decisions which rely on CBAs are based on a discount rate that adequately reflects economic theory.

Insufficient attention has been devoted to this topic by scholars who carried out research on regulatory CBA (Fraiberg and Trebilcock, 1998; Arcuri, 2012). Nonetheless, the discount rate is a crucial variable that has a significant effect on quantitative results of any CBA and any manipulation or mistake in selecting this parameter can dramatically affect the decision to enact or not to enact a policy. As a matter of fact, just consider that the net present value (NPV) of a €1,000,000 net benefit (NB) that will accrue in 30 years is equal to €741,923 using a discount rate

[1] For the role of CBA in the current institutional framework see: for USA, Improving Regulation and Regulatory Review, Executive Order 13563, Presidential Documents, Federal Register, Vol.76, at p.3821; for EU, Smart Regulation in the European Union, COM(2010)543. Several alternative evaluation methods are currently used in regulatory impact assessments, but CBA is the only integrated approach capable of measuring the overall impact of a regulation (Jacobs, 2007).

of 1%; to €231,377 using a discount rate of 5%; and to €57,309 using a discount rate of 10%.

The study is based on a survey of both the main literature on the so-called social discount rate (SDR), which is the discount rate appropriate from a society's perspective, and the related empirical application made by institutional actors. Comparable studies can be found in Zhuang et al. (2007) or in OECD (2009), but in no case has the practical use of the SDR made by analysts in CBAs of regulation been examined. A systematic investigation into regulatory practice vis-à-vis the existing economic theories constitutes the major contribution of this paper.

Any connection between theory and practice for the selection of the SDR is likely to be country-specific, depending on the general normative framework and, more in particular, on the system of regulatory assessment that is adopted. Therefore, this study takes account of a comparative perspective, considering the role of the SDR in regulatory CBAs carried out both in the United States (US) and in the European Union (EU). The US and the EU are comparable in term of economic development[2] and they both enforce a system of regulatory impact assessment. Nevertheless, the respective CBA institutionalization processes followed very different paths[3], thus increasing the significance of this comparison.

The remainder is divided into three main parts. The first part (section 2) focuses on the theoretical debate on the role of the SDR in CBA, providing a quick illustration of the main conclusions concerning the selection of a proper discount rate, investigating the intergenerational discounting problem and considering sensitivity analysis to face uncertainty. The second part (section 3) includes a comparative empirical survey of the use of the SDR in regulatory CBA, first pointing out the methods suggested by institutional actors in the US and in the EU and then analyzing two comparable samples of CBAs selected among American Regulatory Impact Analyses (RIAs) completed by the Environmental Protection Agency (EPA) and European Impact Assessments (IAs) completed by the Directorate-General for the Environment (DG ENV), thus providing an overview never carried out before. Finally, a conclusive section (4) recaps the main findings of the study.

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[2] The US gross domestic product (GDP) in 2010 was US$12,813 billion, while the EU-27 GDP in the same year was US$13,553 billion (data OECD.stat: constant prices, constant PPPS, OECD base year).

[3] For an extensive discussion on the CBA institutionalization process see, for USA, Morral III (1997) and, for EU, Renda (2011).

2. The role of the discount rate in cost-benefit analysis: a theoretical approach

2.1.The social discount rate: which rate should be adopted?

The choice of a proper discount rate to be adopted in economic planning, project evaluation, and public policy formulation can be considered as one of the oldest and most significant issues for scholars who focus on CBA methodology[4]. While in financial analyses there is a common agreement on the correct approach to determine the financial discount rate, in economic analyses, such as CBA of regulation, a crucial dispute is on the selection of the SDR, i.e. the discount rate which is appropriate from a society's perspective (Nas, 1996). Different options are provided by the main economic literature (see Table 2.1, *infra*).

The alternative adoption of an SDR computed using an SMRRPI, an SMRTP, a GLBRIM, or a WSOCC approach mainly depends on the crowding-out effect that stems from project funding. Nevertheless, none of these methods is exempt from criticisms. To the contrary, a strong theoretical appeal is attributed to the SPC, but its practical application is rather difficult; the same flaw affects the OGR approach. As a matter of fact, an ultimate solution to the selection of the most appropriate SDR to be adopted in any CBA is still to be found.

In light of this quick survey, it is worthwhile to underline that, while searching for an SDR, scholars mainly focused on the assessment of public projects, thus lacking an academic debate explicitly centered on discounting legislative and regulatory options. These policies are very peculiar because in many cases they do not involve direct public spending, just ending up imposing direct costs and benefits on consumers and firms. As a consequence, in these circumstances the crowding-out effect due to public spending does not constitute the best key to select the SDR.

[4] For an extensive discussion on the issue see Lind (1982).

Table 2.1. The SDR in the economic literature

Approach to discounting	Main features	Main criticisms	Basic references
Social marginal rate of return on private investment (SMRRPI)	The SMRRPI is the yield (before taxes) on resources invested in the private sector. Public projects funded by government debt crowd out private investment, therefore their returns have to be higher than the SMRRPI, which represents the opportunity cost of making public rather than private investment.	• Public projects are also funded by taxes and/or foreign capitals. • The SMRRPI includes a risk premium for private investment which is usually higher than the one for public projects.	Hirshleifer et al. (1960), Stockfish (1969), and Harberger (1969, 1972b).
Social marginal rate of time preference (SMRTP)	The SMRTP is the rate of return at which society is indifferent in substituting current consumption for future consumption. Public projects funded by taxes crowd out private consumption, therefore their return should be higher than the SMRTP, which represents the opportunity cost of making public investment rather than consuming.	• Public projects are also funded by government debt and/or foreign capitals. • SMRTP can be much lower than SMRRPI, thus harming efficiency.	Sen (1961), Marglin (1963a, 1963b), Arrow (1966), and Kay (1972).
Government long-term borrowing rate on the international markets (GLBRIM)	The GLBRIM is the rate of interest at which governments can borrow money on the international market in an open economy. Public projects funded by foreign capital do not result in crowding-out effects, therefore their returns just have to be higher than the actual financial cost of project funding, which is equal to the GLBRIM.	• Public projects are also funded by national government debt and/or taxes. • An increase in international government borrowing ends up crowding out also private investments and consumption.	Edwards (1985) and Lind (1990).
The weighted social opportunity cost of capital (WSOCC)	The WSOCC is a weighted average of the SMRRPI, the SMRTP, and the GLBRIM, adopting as weights the size of the crowding-out effects on investments and consumptions and the percentage of funds raised abroad.	• The value of the weights assigned to each rate depends on the way a specific project is funded. • Weight estimation is rather difficult to obtain.	Harberger (1969, 1972a, 1972b), Dreze and Sadmo (1971), Edwards (1985), and Boardman et al. (2006).
Shadow price of capital (SPC)	The SPC is a parameter which enables the conversion of all future benefits and costs of public projects into consumption equivalents. The resulting consumption equivalents can be discounted adopting the SMRTP.	• The estimation of the SPC is very complex. • Substantial assumptions on the allocation of future benefits and costs between investment and consumption are required.	Marglin (1963a, 1963b, 1967) and Feldstein (1964).

Optimal growth rate approach (OGR)	By estimating the OGR within the Ramsey growth model, this approach aims at determining the optimal SDR to be used in social discounting. This rate enables the first best allocation between consumption and savings, so that the economy grows at the optimal rate.	• The estimation is inaccurate and involves substantial value judgments. • Negative consumption growth rate, environmental degradation, and resource exhaustion undermine the main assumptions of this approach.	Ramsey (1928) and Islam (2002).

2.2. The intergenerational discounting problem: should the social discount rate be adjusted?

The current academic debate on the SDR mostly focuses on the intergenerational discounting problem. Assuming that people consider the needs of posterity in their choices, these needs should already be embedded in market behaviors and the necessity for an adjustment of the SDR in CBAs becomes less significant. Nevertheless, the main academic literature assumes that individuals take care only of their own future, with no concern for future generations.

In light of this assumption, on the one hand, some scholars argue that future costs and benefits should be discounted using a rate which exclusively considers the preferences of the present generation. Sunstein and Rowell (2007) acknowledge that people's preferences showing little concern for future generations might be questioned and moral obligations to posterity should be fulfilled by the current generation. Nevertheless, they suggest that this argument should not affect the selection and the use of the discount rate in CBA and the intergenerational equity problem should be faced directly[5]. Posner (2007) expresses a more extreme position, asserting that, even if it might seem ethically inappropriate, public agencies should not consider the needs of distant-future generations, just as they currently do for the needs of foreigners.

On the other hand, some scholars argue that the SDR used by the institutional actors should incorporate the welfare of future generations. While Sen (1982) points out several reasons in favor of an SDR lower than the rate of time preference

[5] This problem should affect, *ex ante*, the monetization of future benefits and costs which may actually be underestimated by analysts.

of the current generation, Revesz and Livermore (2008) argue that the current practice of adopting a constant discount rate leads to a negative cost-benefit test for many projects with long-run benefits[6]. They refer to this issue as a "convenient untruth," a practical solution which provides a justification for the inaction of governments and public agencies in developing pro-environmental regulations and projects. This strand might lead to a claim for 0% discounting or even for a negative SDR.

A more equilibrate solution to the intergenerational discounting problem is suggested by Pearce, Atkinson, and Mourato (2006), who underline that the "conventional" discount method, based on a constant and positive SDR, represents just one of the possible assumptions[7], and not necessarily the best. The authors advocate the application of a time-declining discount rate, hence for costs and benefits which occur later in the future a lower discount rate should be used.

2.3. The Sensitivity Analysis: A Workable Solution for the Social Discount Rate Issue

In any CBA, analysts make operational assumptions in order to estimate benefits, costs, project lifetime, discount rates, and so on. Some of these assumptions could be inaccurate or not sufficiently reliable, thus leading to a situation of uncertainty. Several methods have been developed to deal with risk and uncertainty in CBA. Sensitivity analysis is one of the most well-established procedures used by analysts. In practice, a range of plausible values for each significant variable is tested in order to measure to what extent CBA results are sensitive to variations of the main analytical assumptions (Nas, 1996).

Although some SDRs are more suitable than others in particular circumstances, the academic debate has not reached a broad consensus on the most appropriate SDR to be adopted in any CBA of regulation. For these reasons, in this context of uncertainty, the application of a partial sensitivity analysis[8] to the SDR used in a CBA is not only a workable solution, but also highly recommended. The most

[6] The adoption of a too-high discount rate results in penalizing projects which involve long-run benefits (dams, highways, environmental regulations, and so on) and in favoring projects which involve long-run costs (nuclear plants, toxic wastes, and so on).

[7] Exponential discounting based on a constant and positive discount rate is an axiom not empirically verified (Samuelson, 1937).

[8] A partial sensitivity analysis is applied only to the variables or parameters that analysts consider the most significant for CBA.

feasible approach is based on the adoption of at least two different values for the SDR, thus assessing the effects on the NPV. If the sign and the ranking (in case mutually exclusive projects are compared) of the NPV are unaffected by the sensitivity test, then the CBA will be "robust" and the underlying policy recommendations will be more sound. Otherwise, if the results of the CBA are altered, then explicit judgments about the reasonableness of the selected SDR will be required (Pearce, Atkinson, and Mourato, 2006). This method enables analysts to put effort into the selection of the SDR only when relevant to the analysis result.

3. The role of the discount rate in cost-benefit analysis: empirical evidence

3.1. The discount rate suggested by institutional actors — US and EU compared

The current section (3) focuses on the role of the discount rate in legislative and regulatory practice. In this sub-section (3.1) official guidelines are considered, providing a survey of recommendations on discounting issued by institutional actors in the US and the EU.

3.1.1. United States of America

For the US RIA world the survey focuses on the recommendations included in the Circular A-94 and A-4 of the Office of Management and Budget (OMB) and the "Guidelines for Preparing Economic Analysis" of the EPA.

Circular A-94[9] of 29 October 1992 provides OMB's guidance for CBA of federal programs[10]. The real discount rate suggested for the base-case analysis is equal to 7%[11]. This value "*approximates the marginal pretax rate of return on an average investment in the private sector in recent years*"[12]. Furthermore, a sensitivity analysis on the plausible variations of the discount rate is required, considering in particular "*the specific economic characteristics of the program under analysis*"[13]. From a theoretical standpoint, the SPC is deemed the preferred analytical

[9] Circular A-94 of the Office of Management and Budget, Guidelines and Discount Rates for Benefit-Cost Analysis of Federal Programs, 29 October 1992.

[10] Circular A-94 specifically applies also to RIA.

[11] The previous discount rate, suggested in Circular A-94 issued on 27 March 1972, was equal to 10%.

[12] This rate can be considered an estimation of the SMRRPI (see table 2.1, *supra*).

[13] For instance, the use of a higher discount rate is required to evaluate regulatory proposals whose primary cost is to diminish business investments.

instrument; nonetheless, having in mind the information required in order to apply this method, an explicit consensus of the OMB will be required if agencies prefer the SPC to the basic 7% discounting.

With Circular A-4[14] of 17 September 2003[15], OMB provides more specific guidance to federal agencies in order to develop RIAs. In this document the necessity to discount future benefits and costs is explicitly expressed, pointing out that "*it is important to measure them in constant dollars*", therefore preferring an evaluation in real terms. For the selection of the discount rate, Circular A-4 refers to Circular A-94, adding further information. Some ambiguity exists concerning the application of the SPC method because "*shadow prices are not well established for the United States*" and "*the distribution of impacts from regulations on capital and consumption are not always well known*". The 7% discount rate set in Circular A-94 is considered an approximation of the opportunity cost of capital[16], therefore it is appropriate when the regulation under evaluation displaces private investments. An additional discount rate of 3% is provided as estimation of the social rate of time preference (SRTP)[17] by computing the real rate of return on long-term government debt. Considering that a regulatory project can crowd out both private investments and private consumption, regulatory analysis should provide the NPV under both rates (3% and 7%). A further sensitivity analysis at a rate higher than 7% (for instance, 10%) is recommended in case the assessed policy displaces investments in the corporate sector.

The problem of intergenerational discounting is also tackled, suggesting two alternative approaches: using the standard discount techniques, but delivering to policy-makers an additional analysis where the intergenerational concerns are discussed, or carrying out a further sensitivity analysis with a discount rate lower than 3%, but still positive[18].

The EPA issued the new "Guidelines for Preparing Economic Analyses"[19] in December 2010, revising a similar document issued in 2000[20] in order to foster the

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[14] Circular A-4 of the Office of Management and Budget, Regulatory Analysis, 17 September 2003.

[15] This circular took effect in January 2004 for proposed rules and in January 2005 for final rules.

[16] This is the SMRRPI approach (see table 2.1, *supra*).

[17] This is the SMRTP approach (see table 2.1, *supra*).

[18] Using the same positive discount rate across generations is explicitly considered attractive from an ethical standpoint.

[19] EPA, "Guidelines for Preparing Economic Analyses, National Center for Environmental Economics, Office of

"*use of sound science in support of the decision-making process*", therefore including the most recent "*development of economic tools and practices*". Section 6 of this official document deals with discounting future benefits and costs.

The agency underlines the difference between discounting and accounting for inflation, pointing out that analysts who carry out CBAs of environmental policies should consider real values and real discount rates. Likewise, risk should never be included in the discounting analysis, since future benefits and costs should be already monetized as expected value. Furthermore, the difference between social discounting and private discounting is stressed, explaining that the agency should consider discounting from the perspective of society as a whole.

Theoretical descriptions of the SRTP[21], the social opportunity cost of capital[22], and the SPC approaches are provided. Despite the fact that the SPC method is deemed "*the preferred analytic approach*", it is considered too "*difficult to implement in practice*". Considering that EPA policies usually cost a very small fraction of yearly US government borrowing, EPA programs are assumed not to displace private investments. It follows that environmental regulations should be discounted just adopting the SRTP. Furthermore, a box is dedicated to other social discounting perspectives, including the main results of behavioral and experimental economics

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Policy", US Environmental Protection Agency (2010), available on the Internet at: http://yosemite.epa.gov/ee/epa/eed.nsf/pages/Guidelines.html/$file/Guidelines.pdf (last accessed on 15 July 2011).

[20] In the guidelines of 2000 (EPA, "Guidelines for Preparing Economic Analyses, Office of the Administrator, US Environmental Protection Agency (2000), available on the Internet at: http://yosemite.epa.gov/ee/epa/eerm.nsf/vwAN/EE-0228C-07.pdf/$file/EE-0228C-07.pdf (last accessed on 15 July 2011)) for the intragenerational discounting, the EPA recommended using both a discount rate from 2% to 3% and the 7% suggested by OMB, adding a display of the future streams of benefits and costs without computing the NPV, and other sensitivity analyses with a discount rate between 2% and 7%; for intergenerational discounting, an additional sensitivity analysis with a discount rate between 1.5% and 3% was required. In the previous reference document of the EPA (EPA, "Guidelines for Performing Regulatory Impact Analysis", US Environmental Protection Agency (1983, Reprinted in March, 1991), available on the Internet at: http://yosemite1.epa.gov/ee/epa/eerm.nsf/vwAN/EE-0228A-1.pdf/$file/EE-0228A-1.pdf (last accessed on 1 August 2011)) a two-stage procedure was suggested. In the first stage, the cost of capital had to be annualized over the lifetime of the project using the SMRRPI (10%); in the second stage, the streams of benefits and costs had to be discounted using the SMRTP (3%).

[21] This is the SMRTP (see table 2.1, *supra*). EPA suggests estimating this rate with the long-term after-tax and after-inflation returns on savings instruments. An alternative estimation could be provided using the OGR approach (see table 2.1, *supra*). The value of this rate should be included between 2% and 4%.

[22] This is the SMRRPI (see table 2.1, *supra*). EPA suggests estimating this rate with the pre-tax marginal rate of return on private investment. The value of this rate should be included between 4.5% and 7%.

and explaining that this literature is still not well enough established to be applied in the CBA of regulation.

A broad analysis focuses on the issue of intergenerational social discounting. The agency acknowledges that "*conventional*" discounting techniques could be inappropriate for CBAs of projects characterized by very long time horizons. In order to discount intergenerational effects, different theoretical alternatives are considered, such as the adoption of a constant discount rate without differences among intragenerational and intergenerational discounting; the use of a step function which leads to a time-declining discount rate[23] and, more generally, the use of non-constant discount rate; or the use of a constant discount rate, but adjusted for uncertainty[24].

Eventually, the EPA remarks that economists are far from a consensus on the selection of the most appropriate discount rate for CBA of public projects. Therefore the agency provides recommendations which "*are intended as practical and plausible default assumptions rather than comprehensive and precise estimates of social discount rates*". The opportunity to use more accurate empirical estimations is left to the analysts who concretely carry out CBAs for EPA. In conclusion, the agency recommends: displaying the timing of benefits and costs over the time horizon of the assessed program; computing the NPV using the 3% value; computing the NPV using also the 7% rate; and considering the problem of intergenerational discounting for a time horizon higher than 50 years where NBs significantly vary over time, thus adding to the previous analyses a further sensitivity analysis using alternatively a time-declining rate or a lower constant discount rate.

Any alternative method used by analysts "*should be fully described, supported, and justified*". No room is left to use different discount rates for benefits and costs and, among benefits, for impacts on human life, environmental conditions, and so on.

3.1.2. European Union

For the EU IA world, the analysis is focused on the "Impact Assessment Guidelines" issued by the European Commission (EC).

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[23] In this approach the selection of the time horizon when the discount rate should decline is left to analysts.

[24] This approach leads to the adoption of a lower discount rate; uncertainty does not refer to future benefits and costs included in the analysis, but to economic growth and to expected discount rates.

On 15 January 2009 the EC published the new "Impact Assessment Guidelines"[25] which replaced the previous guidelines issued in 2005 (updated in 2006). Among the main steps to carry out a CBA, the Commission explicitly states that the value of the impacts has to be monetized, discounting at a standard discount rate impacts occurring in the future.

The discounting issue is faced in Annex 11.6 of the guidelines[26]. The selected discount rate is 4%, and "*broadly corresponds to the average real yield on longer-term government debt in the EU over a period since the early 1980s*"[27], therefore it is expressed in real terms and should be applied to future benefits and costs estimated at constant prices. For long-term policies a discount rate lower than 4% might be used, in order to deal with "*the longer term implications of sustainable development and in particular, the need to take proper account of the preferences of future generations*". Nevertheless, in note 64 the Commission states that "*for impacts occurring more than 30 years in the future, the use of a declining discount rate could be used for sensitivity analysis, if this can be justified in the particular context*".

3.1.3. Summing up

A summary of the main findings provided by the examination of the recommendations of US and EU institutional actors is included in Table 3.1 (*infra*).

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[25] EC, "Impact Assessment Guidelines", 15 January 2009, European Commission (2009), available on the Internet at: http://ec.europa.eu/governance/impact/commission_guidelines/docs/iag_2009_en.pdf (last accessed on 26 June 2011).

[26] EC, "Part III: Annexes to Impact Assessment Guidelines", European Commission 15 January 2009, available on the Internet at:
http://ec.europa.eu/governance/impact/commission_guidelines/docs/iag_2009_annex_en.pdf (last accessed on 26 June 2011); the Annex 11.6 is the verbatim copy of the Annex 12 of the previous guidelines (EC, "Annexes to Impact Assessment Guidelines", European Commission, 15 June 2005, updated on 15 March 2006, available on the Internet at:
http://legislationline.org/download/action/download/id/2235/file/EU_Annexes_Impact_AssessmentGuidelines_2005am2006.pdf (last accessed on 1 August 2011)).

[27] This rate, according to the suggestions of Nas (1996) and Boardman et al. (2006), can be considered an SMRTP (see table 2.1, *supra*).

Table 3.1. The recommendations on discount rate of US and EU institutional actors

Institutional actor	SDR	Approach to discounting	SDR theoretical notes	Sensitivity analysis on discount rate	Intergenerational discounting
US OMB A-94	7% (real)	SMRRPI	The SPC is the preferred analytical tool, to be adopted by analysts only under OMB explicit consensus.	Higher rate if business investments are displaced.	No info.
US OMB A-4	3% (real) 7% (real)	SMRRPI (7%) SMRTP (3%)	The SPC should not be used because reliable estimations are lacking.	3% and 7%; higher rate (10%) if investments in the corporate sector are displaced; lower rate for intergenerational discounting.	Standard discounting with explicit discussion of the issue, or sensitivity analysis at a lower discount rate.
US EPA guidelines	3% (real) 7% (real)	SMRRPI (7%) SMRTP (3%)	The SPC is the preferred analytical instrument, but inapplicable; the SMRTP is the appropriate SDR for EPA projects (assuming no displacement of private investments); lack of consensus among economists.	3% and 7%; lower rate or time-declining rate for intergenerational discounting.	For time horizons higher than 50 years sensitivity analysis at a lower or time-declining discount rate.
EU EC guidelines	4% (real)	SMRTP	No info.	Recommended in case of intergenerational discounting.	Sensitivity analysis at a lower discount rate; declining discount rate for impacts beyond 30 years if explicitly justified.

3.2. Regulatory discount rate analysis in practice—US and EU compared

In this sub-section (3.2) a comparative survey centered on the practical use of the SDR in CBA of legislative and regulatory policies is provided. The attention focuses

on the RIAs carried out by the US EPA and on the IAs of the EU DG ENV[28] during the period 2005–2010[29].

3.2.1. The Regulatory Impact Analyses of the US Environmental Protection Agency between 2005 and 2010

Since 1997, the Office of Information and Regulatory Affairs (OIRA) has been issuing a yearly "Report to Congress on the Benefits and Costs of Federal Regulations"[30] where it is possible to find a list of all the major rules[31] reviewed by the OMB from 1 October of two years before the publication of the report to 30 September of the year before. Therefore, by consulting the reports issued from 2006 to 2011, it is possible to identify all the final rules for which an RIA of the EPA has been reviewed by the OMB between 2005 and 2010. The RIAs of the selected final rules can be found online alternatively on the web-site of the EPA or in the docket of any rule stored on the web-site http://www.regulations.gov[32]. A complete list of the RIAs analyzed is on file with the author. Table 3.2 (*infra*) shows a summary of the main results.

From 1 October 2004 to 30 September 2010 (a six-year period), EPA carried out 24 RIAs for final rules reviewed by the OMB. Twenty-three RIAs out of 24 are available online and are considered in this empirical analysis. Nineteen RIAs (83% of the total available RIAs) can be defined as CBAs because they include a computation of

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[28] Environmental policies have been selected because it is more likely that they involve long-term effects and intergenerational issues.

[29] This period has been selected because Circular A-4 (*supra* note 14) of the OMB took effect in January 2005, while the first EC "Annexes to Guidelines 2005" (*supra* note 26), which provided the same recommendations on discounting as the current EC "Annexes to Guidelines 2009" (*supra* note 26), took effect in June 2005.

[30] OIRA (OIRA, "Report to Congress on the Costs and Benefits of Federal Regulations and Unfunded Mandates on State, Local, and Tribal Entities", Office of Management and Budget, Office of Information and Regulatory Affairs (2006, 2007, 2008, 2009, 2010, 2011), available on the Internet at: http://www.whitehouse.gov/omb/inforeg_regpol_reports_congress (last accessed on 1 August 2011).

[31] The definition of "major rule" which requires congressional review is provided in Subtitle E of the Small Business Regulatory Enforcement Fairness Act of 1996: *"(A) an annual effect on the economy of $100,000,000 or more; (B) a major increase in costs or prices for consumers, individual industries, Federal, State, or local government agencies, or geographic regions; or (C) significant adverse effects on competition, employment, investment, productivity, innovation, or on the ability of United States-based enterprises to compete with foreign-based enterprises in domestic and export markets*" (see http://archive.sba.gov/advo/laws/sbrefa.html last accessed on 9 August 2011).

[32] Regulations.gov is the official online source for US government regulations from 300 federal agencies, thus improving the access of US citizens to and their participation in the federal regulatory process (web-site last accessed on 1 August 2011).

NBs[33]. In 95% (18) of these 19 CBAs a discounting technique is applied, always using the real discount rates recommended in EPA guidelines and developing a sensitivity analysis (at least either for benefits or for costs). Only in one case is an *ad hoc* estimation of the most appropriate SDR provided. Likewise, the intergenerational issue is faced in only one CBA out of 19.

Table 3.2. The discount rate in US EPA RIAs, 2005–2010

	EPA RIAs for FINAL RULES reviewed by OMB (available RIAs in brackets)	EPA RIAs with calculation of net benefits (CBA)	EPA RIAs with use of discount rate	EPA RIAs with specification of real or nominal discounting	EPA RIAs with 3% and 7% discounting (even if just for benefits or costs, not both)	EPA RIAs with independent estimation of discount rate	EPA RIAs with sensitivity analysis of discounting	EPA RIAs which tackle the inter-generational discounting problem
Number of RIAs	24 (23)	19	22	22	21	1	21	2
with calculation of net benefits (CBA)	19	19	18	18	18	1	18	1
Percentage of total available RIAs (23)	-	83%	96%	96%	91%	4%	91%	9%
Percentage of RIAs with calculation of net benefits (CBA)	-	-	95%	95%	95%	5%	95%	5%

From an in-depth examination of EPA RIAs, the following additional findings emerge: the sensitivity analyses are usually carried out using the 3% and the 7% rates, only in few cases is a 0% discounting analysis added, and in no case is a rate higher than 7% applied; the sensitivity analyses are sometimes partial, applied

[33] In order to have an objective selection criterion, the computation of NBs is assumed to be a proxy of the application of the CBA method. Actually EPA RIAs are not always as well-structured as a comprehensive CBA should be.

either to costs or to benefits with distorting effects on NBs; and time horizons chosen by analysts usually are very short, thus avoiding — but without robust justifications — the intergenerational discounting problem.

3.2.2. The Regulatory Impact Assessments of the EU Directorate-General for the Environment between 2005 and 2010

A list of all the IAs carried out by the EC is available online on the official web-site of this institution[34]. From that list all the IAs made by DG ENV between 2005 and 2010 were selected and included in the current analysis. A complete list of the IAs analyzed, which has been built up verifying, integrating, and upgrading a database of the Centre for European Policy Studies, is on file with the author. Table 3.3 (*infra*) shows a summary of the main results.

From 1 January 2005 to 31 December 2010 (a six-year period), DG ENV carried out 51 IAs for proposal adopted by the EC. Only 9 IAs (18% of the total IAs) can be defined as CBAs because they include a computation of NBs[35]. In 89% (8) of the CBAs carried out by DG ENV a discounting technique is applied, always using the discount rate recommended in the EC guidelines (even if in only one case analysts state explicitly that the analysis is carried out in real terms). A sensitivity analysis (at least either for benefits or for costs) is developed in only two CBAs (22% of the CBAs). In no case is the estimation of an *ad hoc* discount rate provided; neither is the intergenerational discount issue tackled.

From an in-depth examination of DG ENV IAs, the following additional findings emerge: IAs and CBAs are carried out both for binding and nonbinding proposals; the sensitivity analyses are often partial, applied either to costs or to benefits with distorting effects on the computed NBs; likewise, in several cases either costs or benefits are not discounted, while in a few cases relatively high discount rate (8%, 10% or 12%) are adopted; finally, also in Europe, time horizons chosen by analysts usually are very short, thus avoiding — but without robust justifications — the intergenerational discounting problem.

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[34] "Final Impact Assessment Reports" at http://ec.europa.eu/governance/impact/ia_carried_out/cia_2011_en.htm (last accessed on 15 July 2011) is the official source of EC IA reports that are published online after the EC adopts the corresponding proposal.

[35] See note 55, *supra*. The NBs proxy in the EU is weaker than in the US because NBs in DG ENV IAs are not often the result of a genuine CBA.

Table 3.3. The discount rate in EU DG ENV IAs, 2005–2010

	DG ENV IAs for adopted proposal	DG ENV IAs with calculation of net benefits (CBA)	DG ENV IAs with use of discount rate	DG ENV IAs with specification of real or nominal discounting	DG ENV IAs with 4% discounting (even if just for benefits or costs, not both)	DG ENV IAs with independent estimation of discount rate	DG ENV IAs with sensitivity analysis of discounting	DG ENV IAs which tackle the inter-generational discounting problem
Number of IAs	51	9	13	1	11	0	3	0
with calculation of net benefits (CBA)	9	9	8	1	8	0	2	0
Percentage of total IAs	-	18%	25%	2%	22%	0%	6%	0%
Percentage of IAs with calculation of net benefits (CBA)	-	-	89%	11%	89%	0%	22%	0%

3.3. An overview of the empirical evidence

In US official documents, the academic discussion on discounting is explicitly considered, acknowledging the SPC as the preferred analytical solution. Nevertheless, regulators need practical tools to be adopted in CBA. Therefore, the discount rates are just estimated as SMRTP (3%) and SMRRPI (7%), taking account of the possibility to displace both national consumption and private investments. In all the circumstances, benefits and costs have to be discounted at the same rate and considerations about risk and uncertainty should not be included in the SDR. Moreover, sensitivity analysis is highly recommended and several feasible solutions are also suggested to tackle the intergenerational discounting issue. To the contrary, the EU guidelines are by far less accurate and consistent from a theoretical perspective; only an SMRTP (4%) is recommended and the sensitivity analysis is suggested just as a solution to the intergenerational discounting problem.

From the analysis of the selected sample of US RIAs and EU IAs a large difference between the American and the European approach arises. In the US, the adoption of CBA to compute NBs of regulatory policies is widespread, along with the application of discounting techniques in compliance with official recommendations. In almost all the cases a sensitivity analysis of the discount rate is provided, thus evaluating the robustness of CBA results. The intergenerational discount issue is not really tackled by analysts, who prefer to bypass it by fixing a relatively short time horizon for the analyses. To the contrary, in the EU the adoption of the CBA method for the IAs is very limited and even in the cases where NBs are computed, analysts do not carry out a genuine CBA. The application of discounting techniques is even more limited and in many cases it is partial, involving either only costs or benefits or just a few of the available policy options, with distorting effects on IA results. Sensitivity analysis on discounting has a marginal role and in the EU, the intergenerational problem is also bypassed in practice.

It is very important to underline that, both in the US and in the EU, the problem of the selection of the most appropriate SDR for CBA is never explicitly faced in impact assessment documents. In case a CBA (and more generally an RIA or an IA) includes a discounting analysis, analysts either at best confine themselves to adopting the recommendations included in official guidelines or, at worst, select a given discount rate without any plausible explanation.

4. Conclusions

A quick survey of the most well-established literature on economic discounting shows that approaches to discounting which are more general and have a stronger theoretical appeal, such as the SPC or the OGR, are less workable than others. On the contrary, solutions which are more feasible, such as the SMRRPI or the SMRTP approach, are adequate only in particular circumstances and are open to several criticisms. An agreement on the most appropriate SDR to be used in any CBA of regulation has not been reached yet. Furthermore, the current debate on the intergenerational discounting issue is even casting new doubts on the desirability of discounting future benefits and costs. A general consensus among scholars seems to exist only on the adoption of sensitivity analysis to deal with persistent uncertainty related to the SDR selection.

The empirical evidence collected in this study shows that analysts never directly cope with the discounting issue in impact assessment documents. They almost

always rely on discount rates set once and for all in official guidelines, which in the US are more consistent than in the EU under a theoretical perspective. In these guidelines institutional actors, while pointing out the inapplicability of the more reliable analytical solutions (in particular the SPC), provide estimations of the SDR adopting the SMRRPI and/or the SMRTP approach, thus ending up recommending one or two discount rates to be applied in any CBA of regulation. For intergenerational impacts, they suggest carrying out additional analyses adopting a lower or a time-declining discount rate, but in the impact assessments this problem is bypassed by restricting the time horizon of the CBAs. Only in the US, institutional actors explicitly recommend adoption of sensitivity analysis to evaluate the effects that different discount rates have on CBA results.

The systematic investigation into CBA documents vis-à-vis the existing economic theories indicates the existence of a gap between the most well-established economic theory and institutional practice in the selection of the SDR. Discount rates selected in CBA documents are consistent with official guidelines, where only two simple approaches to discounting are adopted. Regulatory decisions which are based on CBA reflect the most workable economic literature on discounting rather than the most theoretically consistent one, thus yielding less reliable and less robust results (in particular in the European context where sensitivity analysis is infrequent).

In light of the existing gap and of its consequences, scholars who aim at improving the quality of rule-making and at fostering the application of CBA in regulatory decisions should improve the "operational validity" (Thomas and Tymon, 1982) of their research, thus filling the gap between theory and practice by providing practitioners with methods that are both consistent and workable.

It is necessary to acknowledge that one of the main limitations of this paper is the small size of the selected sample, hence further research should aim at providing a broader investigation on discount rates adopted in regulatory practice. It is also worth recalling that economic literature on the SDR is mainly centered on the assessment of public projects and an academic debate explicitly focused on the selection of discount rates for regulatory CBA is missing. For this reason, future research on the SDR should try to investigate the peculiar features which characterize regulatory discounting.

Finally, the focus on the SDR is only a narrow research question when considering the broad research problem which inspired this paper, i.e. the possible disconnect

between “knowledge producers” and “knowledge users” in CBA. Therefore, future research could also aim at enlarging the horizons of this study by replicating the scheme hereby adopted to shed light on other key methodological issues for CBA (such as valuing human life, pricing non-market goods, and so on).

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The harmonization of market entry regulation for the operation of air services in the European Union: a comparative survey of the implementation of Regulation (EC) no. 1008/2008 by member states' authorities

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Keywords

Air transport industry, aviation authority, financial fitness, market entry regulation, operating license, Regulation (EC) no. 1008/2008.

Abstract

Regulation (EC) no. 1008/2008 confirmed the operating license granting as a persistent form of entry regulation in the EU air transport market. The comparative survey included in this study is based on data and information collected via questionnaire among 13 aviation authorities of European member states during 2010. This survey suggests that the heterogeneous implementation of the 2008 regulation by national authorities results in imposing unequal obligations on undertakings that have the equal right to operate in the European market for air services. A mix of competition and cooperation among authorities is the most viable approach to foster an effective harmonization of entry regulation in this market. In particular, by maintaining the current level of independence of national authorities, but enhancing information flows among them as well as between them and the European Commission, a voluntary harmonization can be achieved.

1. Introduction

1.1. Air transport industry, from regulation to controlled liberalization

The Chicago Convention of 1944 laid the foundation for the regulation of the air transport industry. As a result, regulation played a crucial role in the development of civil aviation for many years. In many countries, the United States (US) being an exception, airlines used to be state-owned companies that operated as monopolists, service fares used to be regulated, and international air traffic was mainly based on bilateral air service agreements between states (Lyle, 1995). In the rare circumstances where a state allowed more than one player to enter the domestic market, such independent airlines had to undertake a compulsory licensing procedure. In order to grant an air service license, national aviation authorities usually carried out two different checks: on the one hand, they examined the compliance of the company with some "objective" features (safety standards, financial fitness, national ownership); on the other hand, they assessed the effects of new entrant's operations on the incumbent's business (Balfour, 1994).

Nevertheless, following the US Airline Deregulation Act of 1978,[1] in recent decades, the liberalization of domestic aviation markets and the gradual evolution toward "open skies" agreements (to regulate international traffic) deeply changed the industry worldwide. Several reforms affected the air transport industry, thus enabling competition among players and stimulating efficiency, with positive effects for customers in terms of wider choice and lower fares. Learning from the US lesson, the European Union (EU) also began a liberalization process primarily aimed at creating a common internal market and breaking down any national barrier. EU did not consider a complete deregulation of the industry, preferring a mixed approach based on a "controlled liberalization" (Lykotrafiti, 2011) under the form of three packages of measures (1987, 1990, 1992).

1.2. The operating license granting, a persistent form of market entry regulation

The so-called Third Package (1992) completed the single European aviation market (van Hasselt, 1994). In particular, Council Regulation (EEC) no. 2407/92[2]

[1] Public Law 95-504, 24 October 1978.

[2] Council Regulation (EEC) no 2407/92 of 23 July 1992 on licensing of air carriers, Official Journal, L 240,

(hereinafter, Reg. 2407/92), included in the Third Package, set out basic requirements for granting operating licenses to European air carriers.

The effect of this regulation was twofold (Balfour, 1994). On the one hand, it was a liberalization measure. An air carrier that was majority-owned and effectively controlled by nationals of a member state (MS) had the right to apply for an operating license to the national civil aviation authority of the country where "*its principal place of business and, if any, its registered office [were] located*" (art. 4.1, Reg. 2407/92). The competent MS's authority had to grant the operating license to any applicants who met common financial, technical, and nationality standards. The licensed air carrier was allowed to operate air services anywhere in the EU, with complete autonomy in terms of business decisions about capacity and fares (Chang and Williams, 2002). On the other hand, Reg. 2407/92 was a regulatory measure. In order to enter the EU air transport market, any European air carrier was obliged to obtain a regular operating license issued by the competent licensing authority.

The subsequent Regulation (EC) no. 1008/2008[3] (hereinafter, Reg. 1008/2008) recasts and consolidates the Third Package, repealing the 1992 regulation. Chapter II of this new regulation confirms the role of the operating license to allow undertakings established in the EU to operate air services. Therefore, the grant of the operating license is maintained as a persistent form of market entry regulation based on three pillars (the assessment of technical, financial, and ownership and control requirements).

1.3. Did Regulation 1008/2008 introduce a harmonization of entry regulation in the European air transport market?

Operating licenses granted by national authorities are mutually recognized by MSs. Thus, any MS can grant to any eligible undertaking the same right to enter the common market for air services, whose size clearly goes beyond national borders, considering that an air carrier licensed by one MS can provide air services in the whole European market. Therefore, if the requirements mandated by Reg. 1008/2008 were not uniformly applied by national authorities, a distortion in

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24/08/1992, pp. 0001 – 0007.

[3] Regulation (EC) no. 1008/2008 of the European Parliament and of the Council of 24 September 2008 on common rules for the operation of air services in the Community (Recast), Official Journal of the European Union, L 293, 31/10/2008, pp. 3-20.

market entry conditions could arise, because different rules would apply to different undertakings entering the same market. From this perspective, a homogeneous implementation of Reg. 1008/2008 becomes crucial.

Acknowledging the importance of harmonization in market entry regulation, scholars have discussed the consequences of operating license granting in Europe. Balfour (1994) refers to the three pillars (technical fitness, financial fitness, and nationality), as "essentially objective" requirements, thus leaving no room for any debate over market entry distortion, whereas Duchene (1995) casts some doubts, arguing, in particular, that financial fitness requirements leave considerable discretion to the licensing authorities over the assessment of the compliance with standards. The critical viewpoint on the inadequate harmonization of entry regulation in the European air transport market is even strengthened, considering the existing debate on the evaluation of airline performances. Performance assessment of air carriers based on financial information is deemed difficult and not accurate (Schefczyk, 1993). Accordingly, analysts usually focus on operational and non-financial features, giving less importance to the financial ones. Furthermore, in the academic literature, as well as in practice, there is not a common agreement on which financial ratios are the most suitable to evaluate air carriers (Feng and Wang, 2000). As a consequence, it is likely that the assessment of air carriers' financial stability carried out by national authorities will not be "objective" or harmonized.

In light of this discussion and by investigating whether, in the regulatory practice, the assessment of the financial fitness made by MSs' aviation authorities to grant an operating license is uniform, this study aims at understanding to what extent Reg. 1008/2008 introduced a harmonization of entry regulation in the European air transport market. In order to answer this research question, a comparative survey of the implementation by MSs' authorities of Chapter II of Reg. 1008/2008 is carried out, thus providing an updated overview of entry regulation in the European market. Such an empirical analysis has never been performed before.

The paper is divided into three main parts. The first part (section 2) includes a quick description of Chapter II of Reg. 1008/2008, which regulates operating licenses. The second part (section 3) focuses on the comparative survey, discussing the information directly provided by 13 aviation authorities of EU MSs. Finally, a concluding section (4) recaps the main findings of the work, shedding light on the above-described debate and discussing the potential effects of two available

alternatives to the *status quo* (i.e., a further deregulation or a greater regulatory harmonization).

2. A quick description of Chapter II of Regulation 1008/2008, the role of the operating license

2.1. The main reason for the economic regulation

Reg. 1008/2008 acknowledges the potential connection between financial fitness of airlines and safety of air services. Therefore, a stringent monitoring of the financial health of air carriers is deemed necessary (recital 3). Such a monitoring role is attributed to the competent authority of the same MS that grants the Air Operator Certificate (AOC)[4] to the air carrier (recital 4). This authority has to carry out a regular assessment of the financial fitness of any licensed air carrier (recital 5). Undertakings that are not able to comply with financial requirements specified in the regulation are forbidden from operating air services in Europe, having their licenses revoked or suspended (recital 6).

2.2. Chapter II, the operating license

To operate air services, an air carrier established in the EU has to obtain a regular operating license,[5] the granting and maintenance of which is subject to the compliance with requirements spelled out in Chapter II of Reg. 1008/2008 (art. 3). The licensing authority of an MS can grant the operating license to an undertaking which (art. 4) is located in that state, holds an AOC granted in the same state, has at its disposal one or more aircrafts, operates air services as its main activity, has a company structure that enables the application of Chapter II of the regulation, is owned or effectively controlled by MSs and/or their nationals, complies with the financial conditions specified in article 5, complies with the insurance requirements set out by article 11 of this regulation and in Regulation (EC) no. 785/2004,[6] and complies with the provisions on good repute set out in article 7.

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[4] The AOC is "*a certificate delivered to an undertaking confirming that the operator has the professional ability and organisation to ensure the safety of operations specified in the certificate, as provided in the relevant provisions of Community or national law, as applicable*" (art. 2.8, Reg. 1008/2008).

[5] The operating license is "*an authorisation granted by the competent licensing authority to an undertaking, permitting it to provide air services as stated in the operating licence*" (art. 2.1, Reg. 1008/2008).

[6] Regulation (EC) no. 785/2004 of the European Parliament and of the Council of 21 April 2004 on insurance requirements for air carriers and aircraft operators, Official Journal of the European Union, L 138, 30/04/2004, pp. 1-6.

Two categories of operating licenses exist. Undertakings that intend "*to cover operations with aircraft of less than 10 tonnes maximum take-off mass (MTOM) and/or less than 20 seats*" (art. 5.3) can apply for the so-called "B" category license. Other air carriers whose operations exceed these thresholds are obliged to apply for the "A" category license. In order to grant the "A" license to a first-time applicant, the licensing authority has to assess that the undertaking "*can meet at any time its actual and potential obligations established under realistic assumptions, for a period of 24 months from the start of operations; and […] can meet its fixed and operational costs incurred by operations according to its business plan and established under realistic assumptions, for a period of three months from the start of operations, without taking into account any income from its operations"* (art. 5.1). For this assessment, the first-time applicant has to submit to the competent authority a business plan for at least the first three years of activities, pointing out all financial connections with other businesses in which it is involved. Other documents and information to be submitted are specified in paragraph 1 of annex I to the regulation.[7] To the contrary, first-time applicants for "B" licenses only have to "*demonstrate that their net capital is at least EUR 100.000*" (art. 5.3)[8].

Furthermore, the licensed air carrier has to notify the competent authority "*in advance of any plans for the operation of a new air service to a continent or a world region not previously served, or any other substantial change in the scale of its activities[…]; in advance of any intended mergers or acquisitions; and […] within 14 days of any change in the ownership of any single shareholding which represents 10% or more of the total shareholding of the Community air carrier or of its parent or ultimate holding company*" (art. 8.5). In case the authority deems the notified changes to have a significant effect on the financial health of the air carrier, the submission of an updated business plan, which includes these changes and covers at least 12 months, is required, as well as the provision of the documents and information specified in paragraph 2 of annex I to the regulation.[9] Within three

[7] For instance (paragraph 1, annex I Reg. 1008/2008), "*the most recent internal management accounts and, if available, audited accounts for the previous financial year […] a projected balance sheet, including profit-and-loss account, for the following three year […] details of the start-up costs incurred in the period from submission of an application to the commencement of operations and an explanation of how it is proposed to finance these costs*", and so on.

[8] Air carriers whose turnovers exceeds 3,000,000€ per year might be excluded from this exemption.

[9] For instance (paragraph 2, annex I Reg. 1008/2008), "*the most recent internal management balance sheet and audited accounts for the previous financial year […] precise details of all proposed changes […] cash-flow*

months, the authority has to assess the revised business plan in order to check the financial stability of the undertaking and thereby the continuing validity of its license.

The operating license does not expire, but is valid until the air carrier complies with the requirements specified in Chapter II of the regulation. Accordingly, the licensing authority has also to monitor the ongoing financial fitness of any licensed air carrier and to review the compliance with the regulation "*two years after a new operating licence has been granted; […] when a potential problem has been suspected*[10]*; or […] at the request of the Commission*" (art. 8.2).[11] To allow monitoring, the licensed air carrier is obliged to "*provide to the Authority its audited accounts no later than six months following the last day of the respective financial year*" (art. 8.4). Moreover, upon request of the authority, the air carrier is also obliged to submit the documents and information specified in paragraph 3 of annex I to the regulation.[12]

Based on the evaluation of the air carrier's financial stability, the authority can suspend or revoke the operating license in case it deems that the undertaking is not able to meet its actual and potential obligations. Nevertheless, a temporary license (not exceeding a one-year period) can be granted, in order to allow the air carrier to reorganize its financial structure, provided that there is no risk for the safety of the operations, the temporary license complies with any change intervened in the AOC, and a proper financial restructuring is concretely possible.

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statements and liquidity plans for the following year, including all proposed changes in structure or activities with a significant bearing on finances", and so on.

[10] The assessment of the financial fitness is necessary, within three months, whenever there are "*clear indications that financial problems exist or when insolvency or similar proceedings are opened against a [*licensed*] air carrier*" (art. 9.2, Reg. 1008/2008).

[11] Furthermore, the operating license needs to be re-approved in case the undertaking (art. 8.3, Reg. 1008/2008) "*has not started operations within six months of the granting of an operating license; […]has ceased its operations for more than six months*", or has increased the size of its activities overcoming the size thresholds specified in article 5.3 (Reg. 1008/2008).

[12] For instance (paragraph 3, annex I Reg. 1008/2008), "*audited accounts no later than six months following the last day of the relevant financial year, unless otherwise provided for in national law and, if necessary, the most recent internal management balance sheet […] a projected balance sheet, including profit-and-loss account, for the forthcoming year […] past and projected expenditure and income figures on such items as fuel, fares and rates, salaries, maintenance, depreciation, exchange rate fluctuations, airport charges, air navigation charges, ground handling costs, insurance*", and so on.

2.3. Emerging issues

The granting of the operating license is subject to the assessment of the compliance with financial, technical, and nationality requirements. Acknowledging a connection between financial health of air carriers and safety of the air services, a crucial role is attributed to the assessment of the air carriers' financial fitness. MSs' licensing authorities are responsible to check the ability of air carriers to meet their actual and potential obligations. The assessment of the financial fitness is compulsory both to grant a new operating license to first-time applicants and to confirm existing licenses to holders that are planning changes with a significant bearing on their finances. Furthermore, the authorities have to steadily monitor the continuing financial fitness of existing license holders.

Many doubts arise regarding the level of harmonization achieved by Reg. 1008/2008. Two issues are particularly relevant in these circumstances. First, discrepancies may arise among information that authorities collect from undertakings. In fact, no substantial indications are provided on data that should actually be included in the documents that air carriers have to submit. In practice, divergences among data provided by air carriers may be significant. For instance, the contents of business plans are not standard and can be largely heterogeneous because they rely on managerial decisions that are discretionary.[13] Likewise, the preparation of audited accounts as well as financial statements, internal managerial balance sheets, liquidity plans, or projected balance sheets may significantly differ, both among undertakings from the same country and, to a greater extent, among undertakings from different countries.[14]

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[13] On the one hand, different air carriers can submit to the same authority business plans with different structures, based on the information that the undertaking's management is willing to deliver, thus complicating the assessment procedure. On the other hand, different authorities can request for particular information to be included in the air carriers' business plans, thus creating divergences among countries in license granting procedure.

[14] Regulation (EC) no. 1606/2002 (of the European Parliament and of the Council of 19 July 2002 on the application of international accounting standards) obliges, since 2005, all EU listed companies (including banks and insurance companies) to prepare their consolidated financial statements in accordance with International Financial Reporting Standards (IFRS). Therefore, other national undertakings can still adopt national accounting standards. Differences may arise between data submitted by listed air carriers and not-listed air carriers, as well as between air carriers that adopt different national standards in preparing their statements. For further discussion on divergences between IFRS and national accounting standards, see Ashbaugh and Pincus (2001), d'Arcy (2001), and Ding et al. (2007).

Secondly, and more importantly, wide discretion is left to licensing authorities in carrying out the assessment. In fact, no indications are provided regarding either the assessment techniques to be adopted or indicators or variables to be measured and monitored. Thus, the regulation lacks any detailed guidance on how to evaluate the financial health of an air carrier or even to identify financial instability. Consequently, this discretionary power may lead to largely different applications of the 2008 regulation in any MS. Such an occurrence, which might result in a distortion in market entry for the operation of air services in the EU, can be investigated by carrying out a comparative survey of the implementation of Reg. 1008/2008 by MSs' aviation authorities.

3. A comparative survey of the implementation of Regulation 1008/2008 by member states' authorities

3.1. Methodology

The comparative survey included in this section (3) provides an updated overview of market entry regulation (granting of operating licenses) for the operation of air services in the EU market. In order to collect relevant information, during the second half of 2010, a questionnaire[15] was sent to a representative sample of competent licensing authorities of EU MSs. The sample included the aviation authorities of EU-15 countries.[16] The selection was made considering that in 2010, EU-15 MSs were responsible for the 87% of passengers (995,788,701 units out of a total of 1,146,675,065 units transported in EU-27 and European Free Trade Agreement [EFTA] countries in 2010[17]) and the 95% of freight and mail (14,280,909 tonnes out of a total of 15,107,443 tonnes transported in EU-27 and EFTA countries in 2010[18]) transported by air in Europe. In addition, the selected MSs have a long-term and well-established experience in implementing EU rules.

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[15] In American English.

[16] Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain, Sweden, and United Kingdom.

[17] These figures are obtained by adding the number of passengers transported in each reporting country. Therefore, passengers of intra-European flights are double counted (data EUROSTAT, "*Air passenger transport by reporting country [avia_paoc],*" last update 25 October 2011, extracted on 02 January 2012).

[18] These figures are obtained by adding the tonnes of freight and mail transported in each reporting country; therefore, freight and mail transported on intra-European air cargo flights are double counted (data EUROSTAT, "*Freight and mail air transport by reporting country [avia_gooc],"* last updated 25 October 2011, extracted on 02 January 2012).

Upon requests of some authorities, the collected data were confidential; hence, the results of the survey, with the exception of subsection 3.3. (see *infra*), are shown in an anonymous form.[19]

A total of 13 national authorities out of 15 kindly cooperated in the survey:

- Austria, Bundesministerium für Verkehr, Innovation und Technologie (BMVIT);
- Denmark, Civil Aviation Administration (CAA) - Statens Luftfartsvæsen;
- Finland, Finnish Transport Safety Agency (TraFi);
- France, Direction Générale de l'Aviation Civile (DGAC);
- Germany, Luftfahrt-Bundesamt (LBA);
- Greece, Hellenic Civil Aviation Authority;
- Ireland, Commission for Aviation Regulation (CAR);
- Italy, Ente Nazionale Aviazione Civile (ENAC);
- Luxembourg, Direction de l'Aviation Civile (DAC);
- The Netherlands, Inspectie Verkeer en Waterstaat (IVW)/Luchtvaart – Civil Aviation Authority;
- Portugal, Instituto Nacional de Aviaçao Civil (INAC);
- Spain, Agencia Estatal de Seguridad Aérea (AESA);
- Sweden, Swedish Transport Agency (Civil Aviation Department).

The 13 respondent authorities can still be considered a representative sample of European civil aviation authorities. In 2010, these authorities were responsible for the 68% of passengers (779,214,274 units)[20] and the 71% of freight and mail (10,747,909 tonnes)[21] transported by air in Europe. Considering the research question stated in section 1.3 (see *supra*), in case this comparative survey reveals a perfect homogeneity among the respondent authorities, it will not be possible to infer that the implementation of Reg. 1008/2008 is homogeneous in the EU. However, in case heterogeneity is detected, it will be possible to argue that European aviation authorities do not homogenously implement Reg. 1008/2008.

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[19] In any table included in subsections 3.4 and 3.5 (see *infra*), a letter of the alphabet (from A to O) has been assigned to each authority. The same letter always identifies the same authority. Letters have been assigned randomly.

[20] See note 17, *supra*.

[21] See note 18, *supra*.

The questionnaire adopted for the survey aimed at collecting information on the following issues:

- number of operating licenses revoked for failure to comply with financial requirements referred to in Reg. 1008/2008 (see subsection 3.2., *infra*);
- national laws or regulations implementing Reg. 1008/2008 (see subsection 3.3., *infra*);
- information requested by authorities from (see subsection 3.4., *infra*):
    - first-time applicants, to assess their financial fitness;
    - existing license holders that are planning a change in their structure or in their activities with a significant bearing on their finances, in order to assess the continuing financial fitness;
    - existing license holders, to assess the continuing financial fitness;
- methods and tools adopted by authorities to make an in-depth assessment of airlines financial situation on the basis of collected data (see subsection 3.5., *infra*);
- variables, if any, usually monitored by authorities as proxy indicators of emerging financial problems for operating license holders (see subsection 3.5., *infra*).

3.2. The licensing activity in the EU market for air services

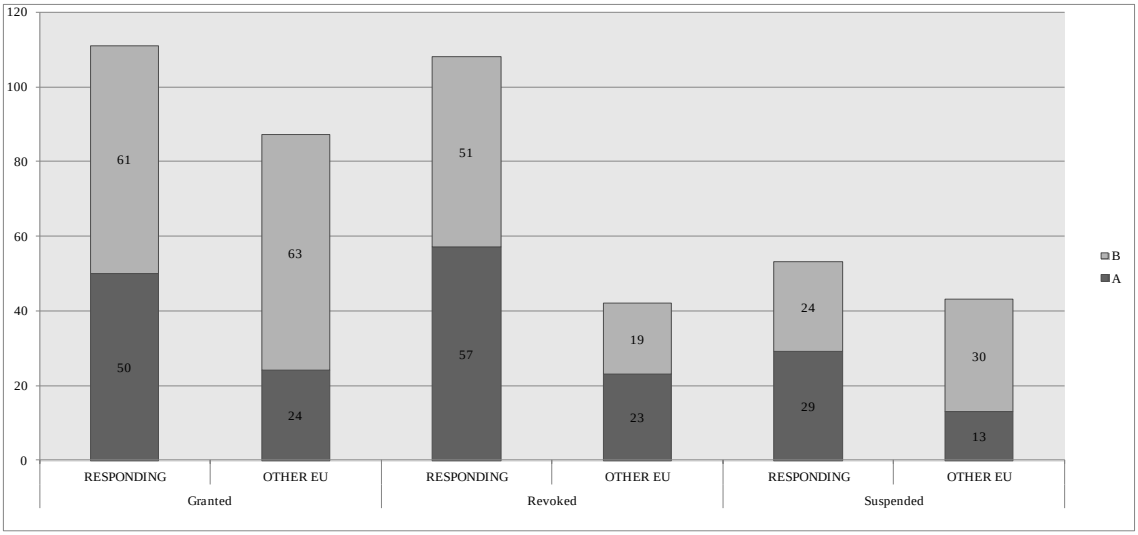
On the basis of article 10.3 of Reg. 1008/2008, a list of decisions of the competent authorities to grant, suspend, or revoke operating licenses is annually published in the Official Journal of the European Union (OJEU). In the EU, from the entry into force of the 2008 regulation[22] to the end of 2010, 198 operating licenses were granted (37% were "A" category licenses), 150 were revoked (53% were "A"), and 96 were suspended (44% were "A"). In the same period, the respondent authorities granted 111 operating licenses (45% were "A"), revoked 108 licenses (53% were "A"), and suspended 53 (55% were "A") (see figure 3.1, *infra*).

Unfortunately, no indications of the official reason to revoke the operating licenses are provided in the OJEU. Nevertheless, from the information provided by the respondent authorities, in 2009, about 65% of the revocations were due to a failure to comply with financial requirements referred to in article 5 of Reg. 1008/2008. In

[22] Regulation (EC) no 1008/2008 was enacted on 24 September 2008 and entered into force on the following day.

light of this evidence, the assessment of the financial fitness of air carriers certainly plays a crucial role in the EU market for air services.

Figure 3.1. Operating licenses (A and B categories) granted, revoked, and suspended by respondent authorities and by other EU-27 MS authorities (from entry into force of Reg. 1008/2008 to the end of 2010)



Source: own elaboration on OJEU data.

3.3. National laws or regulations implementing Regulation 1008/2008

Being a regulation of the EU, Reg. 1008/2008 is binding in its entirety and directly applicable in all MSs. Therefore, in any country that does not enact an implementing piece of legislation, the application of this regulation is direct. Nevertheless, as shown in table 3.1 (*infra*), only 3 countries (Denmark, Luxembourg, and the Netherlands) out of 13 do not adopt any national piece of legislation that aims at least at facilitating the application of Reg. 1008/2008. Such evidence points out that this European regulation needs further specifications in order to be applied by MSs. As a result, national institutions end up filling the existing gaps with laws and other administrative acts, which may lead to differences in the implementation of the regulation at a national level.

Table 3.1. National laws or regulations implementing Regulation 1008/2008

Country	National laws and regulations
Austria	No national laws or regulations. Nevertheless, 3 administrative acts (*Merkblatt* n.1, n.2, and n.3) point out the information requested to air carriers by BMVIT on the basis of Articles 5 and 8 of Reg. 1008/2008.
Denmark	No national laws or regulations.
Finland	Aviation Act (no. 1194/2009) 70 §.
France	Articles L.330-1, L.330-2, and from R.330-1 to 330-24 of the Civil Aviation Code.
Germany	Luftverkehrsgesetz (LuftVG) and Luftverkehrs-Zulassungs-Ordnung (LuftVZO).
Greece	Ministerial Decision D1/D/30817/2180/9-9-91, compatible with Reg. 1008/2008.
Ireland	European Communities (Common Rules for the Operation of Air Services in the Community) Regulations, 2008 (Statutory Instrument no. 426 of 2008).
Italy	Italian Navigation Code and Circular ENAC EAL-16. While this comparative survey was carried out, this regulation was being updated.
Luxembourg	No national laws or regulations.
The Netherlands	The Reg. 1008/2008 is directly applicable on the basis of the Article 16 of the Dutch Law regulating the aviation industry (*Luchtvaartwet*). No further laws and regulations implements the Reg. 1008/2008.
Portugal	No national laws or regulations. Nevertheless, since 2003, an internal regulation had implemented the paragraph 3 of the Article 8 of Reg. (EEC) no. 2497/1992 on aircraft leasing. While this comparative survey was carried out, this national regulation was being updated taking into account the Article 13 of Reg. 1008/2008.
Spain	No national laws or regulations. Nevertheless, a bylaw lists the documentation required by AESA in order to apply for an operating license.
Sweden	National regulation BCL-A3. While this comparative survey was carried out, this regulation was being updated.

3.4. Information and data requested from undertakings for the assessment of the financial fitness

As explained in section 2 (*supra*), MSs' aviation authority have to assess the financial fitness of air carriers in order to grant, refuse, suspend, or revoke their operating licenses. For this reason, authorities have to collect data and information from first-time applicants, from existing license holders who plan changes in their structure or their activities, and from existing license holders to check their continuing financial stability.

Focusing on license granting (see table 3.2, *infra*), 8 authorities (A, B, C, G, I, L, M, and O) out of 13, in line with Reg. 1008/2008 adopt two different procedures depending on the size of the first-time applicant ("A" and "B" categories). Moreover, only 5 authorities (A, B, D, I, and M) out of 13 request only the documents and information mandated by the 2008 regulation, while the remaining provide further details on data and information that undertakings have to submit. In particular, in

country C, operational guidelines are available for first-time applicants with a comprehensive and detailed description of all the information to submit in order to obtain the operating license; in countries F, L and N, the authorities ask applicants to fill out standard forms, thus improving data collection in order to facilitate the assessment of the financial fitness, to enable the comparison among air carriers, and to enhance the information reliability.

Table 3.2. Information and data requested from first-time applicants

Country[a]	Information and data
A	Two size categories are considered for first-time applicants. "A" companies have to submit information and data listed in paragraph 1 of annex I to Reg. 1008/2008. "B" companies have to provide the information requested in paragraph 3 of Article 5 of the same Regulation.
B	Two size categories are considered for first-time applicants. "A" companies have to submit information and data listed in paragraph 1 of annex I to Reg. 1008/2008. "B" companies have to demonstrate that their net capital is at least 100,000€.
C	The authority published an operational guide where a comprehensive and detailed description of all the required information and data is provided. The guide is divided into two sections, considering two size categories for first-time applicants (A and B).
D	First-time applicants have to submit information and data listed in paragraph 1 of annex I to Reg. 1008/2008. The role of the business plan is particularly stressed.
E	First-time applicants have to submit a certified annual balance sheet, a current subsidiary trial balance, a budget, and current statements of account.
F	First-time applicants have to submit a three-year business plan pointing out all the financial connections with other businesses, as well as information and data listed in paragraph 1 of annex I to Reg. 1008/2008. To submit this information, any air carrier has to fill out special forms provided by the authority.
G	Two size categories are considered for first-time applicants. "A" companies have to submit annual accounts, a three-year projected balance sheet, a three-year business plan, traffic and revenues forecasts, start-up costs, financial sources, and funding for aircrafts/leasing. "B" companies have to demonstrate that their net capital is at least 100,000€ and that they are able to meet their obligations for at least 12 months.
H	First-time applicants have to submit an audited balance sheet (even if provisional), a three-year business plan, a liquidity plan, a budget plan, a cash-flow plan (excluding earnings for the first three months of operation), and the address of a reference credit institute (relieved from the banking secrecy). The role of the liquidity plan is particularly stressed.
I	First-time applicants have to comply with the requirements under Reg. 1008/2008. A kick-off meeting between the authority and the first-time applicants is required to explain the licensing procedure.
L	First-time applicants are requested to fill out and to submit an application form, thus enclosing all the requested documentation. The authority, which distinguishes between two size categories (A and B), collects all information and data listed in Reg. 1008/2008 and additional information about organization and management, business activities, corporate structure, and aircraft fleet.

M	Two size categories are considered for first-time applicants. "A" companies have to submit the information and data listed in paragraph 1 of annex I to Reg. 1008/2008. "B" companies have to submit an audited balance sheet and demonstrate that their net capital is at least 100,000€.
N	First-time applicants have to fill out an application form and submit a business plan. The authority checks whether the applicant has sufficient capital at the start of the operations.
O	Two size categories are considered for first-time applicants. "A" companies have to submit information and data listed in paragraph 1 of annex I to Reg. 1008/2008. These companies have also to provide detailed information about their operational plans. "B" companies have to provide the data requested in paragraph 3 of Article 5 of the same regulation.

Note: (a) The collected data are shown in an anonymous form.

Considering data and information requested from existing license holders who are planning a change in their structure or in their activities with a significant bearing on their finances (see table 3.3, *infra*), only in three countries (A, B, and O) is a special procedure adopted for "B" category air carriers. Furthermore, 7 authorities (A, B, C, D, I, G, and M) out of 13 request only the information required by the regulation, while the remaining 6 authorities (E, F, H, L, N, and O) ask for additional information. In two countries (F and L), special standard forms have to be filled out, thus collecting homogeneous data from applicants.

Table 3.3. Information and data for the assessment of changes in structure or activities

Country[a]	Information and data
A	Two size categories are considered. "A" companies have to submit information and data listed in paragraph 6 of Article 8 and in paragraph 2 of annex I to Reg. 1008/2008. "B" companies have to provide information and data referred to under paragraph 8 of Article 8 of the same Regulation.
B	Two size categories are considered. "A" companies have to submit information and data listed in paragraph 2 of annex I to Reg. 1008/2008. "B" companies have to demonstrate that their net capital is at least 100,000€.
C	Existing license holders have to submit information and data listed in paragraph 2 of annex I to the Reg. 1008/2008.
D	Existing license holders have to submit the information referred to under paragraph 6 of Article 8 of Reg. 1008/2008 and information and data listed in paragraph 2 of annex I to the Reg. 1008/2008.
E	Existing license holders have to submit a current subsidiary trial balance, including a profit and loss statement, an adjusted budget, and current flight time and passenger statistics.
F	Existing license holders have to submit a business plan, which includes the changes and covers at least 12 months from the date of implementation, all information and data listed in paragraph 2 of annex I to Reg. 1008/2008, and audited accounts of the previous financial year. To submit this information, any air carrier has to fill out special forms provided by the authority.

G	The authority of this country explains that the case of an existing license holder that is planning a change in its structure/activities with a significant bearing on its finances has not yet been addressed. The standard procedure requires that existing license holders submit a revised business plan that takes into account the proposed changes.
H	Existing license holders have to submit the same information and data requested from first-time applicants. Furthermore, a personal meeting is required in order to preliminarily assess the proposed changes.
I	Existing license holders have to comply with requirements under Reg. 1008/2008. In particular, air carriers have to submit an updated/revised business plan, which the authority may submit to an external auditor/expert in order to assess the financial fitness.
L	Two different procedures are designed. If the authority has recently issued a financial audit, existing license holders will have to submit detailed information about all the proposed changes, an updated budget, and additional information about all the significant elements involved in the changes. If the authority has not recently issued a financial audit, air carriers will have to submit all information and data requested from first-time applicants.
M	Existing license holders have to submit a revised business plan, all information and data listed in paragraph 2 of annex I to Reg. 1008/2008, and the information referred to under Article 4 of the same Regulation as requirements for granting an operating license.
N	Existing license holders have to submit a new business plan with a forward-looking report carried out by an independent accountant.
O	Two size categories are considered. "A" companies have to submit information and data listed in paragraphs 5 and 6 of Article 8 and in paragraph 2 of annex I to Reg. 1008/2008. These companies have to also provide detailed information about revised operational plans. "B" companies have to provide information and data referred to under paragraph 8 of Article 8 of the same regulation.

Note: (a) The collected data are shown in an anonymous form.

In terms of data and information collection, the wider differences of implementation of Reg. 1008/2008 among authorities are detected in the assessment of the ongoing financial stability of licensed air carriers (see table 3.4, *infra*). A different procedure depending on the air carrier size is adopted only by 4 authorities (A, D, H, and O) out of 13. In these countries, "A" category undertakings have to submit additional data and are subject to stricter controls. Moreover, only 4 authorities (I, M, N, and O) out of 13 just ask for the documents and information listed in the regulation and, in particular, only 2 authorities (M and N) request air carriers to submit just their audited accounts no later than 6 months following the last day of the respective financial year. In the remaining 9 countries (A, B, C, D, E, F, G, H, and L), air carriers are obliged to submit additional data and information. Furthermore, in 2 countries (A and D), detailed information on financial and operational data are required on a monthly (or at least quarterly) basis, and in other 3 countries (B, C, and G), in-depth and more frequent monitoring is performed for air carriers with suspected financial problems. In countries F and O,

undertakings are required to submit data and information by filling out standard forms.

Table 3.4. Information and data for the assessment of the continuing financial fitness

Country[a]	Information and data
A	Operating license holders have to submit all information and data referred to under paragraph 4 of Article 8 of Reg. 1008/2008. Furthermore, "A" companies have to submit each month (no later than 20 days after the end of the month) their monthly turnover, level of cash at the end of the month, and the number of flight hours for each type of aircraft.
B	Existing license holders are requested to provide yearly a report package that includes a copy of the latest audited accounts with explanatory notes. Air carriers with suspected financial problems have to provide additional information.
C	Existing license holders have to submit information and data listed in paragraph 3 of annex I to Reg. 1008/2008. Furthermore, at the beginning of any year, the provisional results of the companies are requested. Air carriers with suspected economic or financial problems will be monitored more frequently.
D	Existing license holders have to submit data referred to under paragraph 4 of Article 8 of Reg. 1008/2008. Since October 2008, all "A" companies have had to also submit management accounts and other information (load factor, number of passengers, fuel costs, etc.) on a monthly/quarterly basis.
E	Existing license holders have to submit a certified annual balance sheet, a subsidiary trial balance including a profit and loss statement, a budget for the following fiscal year, and flight time and passenger statistics.
F	Existing license holders have to submit the audited accounts of the previous financial year. In particular circumstances, all of the information listed in paragraph 3 of annex I to Reg. 1008/2008 is required. To submit this information, any air carrier has to fill out special forms provided by the authority.
G	Existing license holders have to yearly submit a financial statement and a balance sheet. In case financial difficulties are detected, further information is required.
H	Two size categories are considered. "A" companies have to submit a balance sheet, provisional balance status, or a certificate of liquidity position, a liquidity plan, a business plan, the address of a reference credit institute that is relieved from the banking secrecy, and, optionally, a comfort letter and a going concern assumption. "B" companies have to demonstrate that their net capital is at least 100,000€ and they have to submit optionally a balance sheet or provisional balance status, loan contracts, bank inquiry about the reliability of shareholders or the existing bails, a comfort letter, and an expert's report about existing hidden reserves.
I	Existing license holders have to submit information and data listed in point 3 of annex 1 to Reg. 1008/2008.
L	Existing license holders have to submit a projected balance sheet including a profit and loss statement (24 months), recent internal management accounts, audited accounts for the previous financial year, a projected cash-flow statement, and liquidity plans (24 months).
M	Existing license holders have to submit their audited accounts no later than 6 months following the last day of the respective financial year.
N	Existing license holders have to submit their audited accounts no later than 6 months following the last day of the respective financial year.

O	Two size categories are considered. "A" companies have to submit information and data listed in paragraph 3 of annex I to Reg. 1008/2008. To submit this information, these companies have to fill out special forms provided by the authority. "B" companies have to provide information and data referred to under paragraph 4 of Article 8 of the same Regulation.

Note: (a) The collected data are shown in an anonymous form.

3.5. Methods and tools for the assessment of the financial fitness and proxies of emerging financial problems

Wide differences have been detected about data collected by MSs' aviation authority. Nonetheless, the comparative survey points out that even more significant differences exist in the way national authorities process data and information to carry out the financial fitness evaluation.

Focusing on methods and tools adopted to assess the financial stability (see table 3.5, *infra*), balance sheet analysis seems to be a common feature among countries. Authorities of countries A, B, C, D, E, F, G, L, M , N, and O (11 out of 13) base their assessments on the computation of financial ratios and other balance sheet indicators. In 6 countries (A, B, D, G, L, and O) out of 13, special electronic spreadsheets or software are adopted in order to perform a faster, more homogeneous and more reliable analysis. In the majority of countries, aviation authorities carry out the assessment in-house; in fact, only in 2 cases (I and N) is the assessment outsourced to external experts.

Table 3.5. Methods and tools for the assessment of the financial fitness

Country[a]	Methods and tools
A	The assessment of the financial fitness is based on 4 main pillars: analysis of activities performed; analysis of the financial equilibrium; analysis of profitability and revenues; and assessment of the air carrier ability to meet short-term financial obligations. To carry out these analyses, the authority relies on a special software that enables the authority to work on data which comply with the format provided by national fiscal accounting rules.
B	Data submitted by air carriers (report package) fit into a spreadsheet and are processed in order to assess some key elements. The electronic processing enables the authority to monitor the historical evolution of an air carrier's financial situation and to make comparisons among different license holders.
C	The most significant financial ratios are computed using financial data provided by air carriers.
D	Collected financial data are transferred to a spreadsheet in order to obtain quick balance sheet ratios. In all the circumstances when air carriers provide forecasts and projections, the authority checks the reliability of these data.

E	Data are analyzed by computing the main balance sheet ratios, with a special focus on profitability and liquidity. Furthermore, on-site inspections are possible.
F	Collected data are processed in order to assess the economic and financial situation of the air carriers (balance sheet analysis), with a special focus on the ability to meet operational needs with adequate financial resources and to create value and income, thus meeting stakeholder interests.
G	Internal experts on economic oversight analyze the financial statements using a special software.
H	Liquidity plans, submitted both by first-time applicants and "A" companies, are monitored and have to comply with standard thresholds.
I	In case financial difficulties are detected, the authority performs an audit with the assistance of specialized external auditors/experts.
L	Two software are adopted: a "route-planner," which enables users to calculate specific costs for each flight route operated by a company, and a software to compute balance sheet indicators, which enables users to carry out a homogeneous analysis of collected data.
M	In order to assess the air carrier's financial fitness, the authority carries out a balance sheet analysis. A crucial role is given to financial indicators such as liquidity and solidity ratios.
N	The assessment of financial fitness is not carried out in-house; hence, it is based on risk analyses and audit reports of external independent accountants. All the information about methods and tools adopted for the assessment (financial ratios included, computational methods adopted, and so on) are provided to air carriers. The authority aims at restoring the financial fitness of a company; therefore, its intervention is gauged depending on the financial situation of the air carrier and distinguishing among potentially insolvent carriers, insolvent carriers, and bankrupt carriers.
O	In order to assess the air carrier financial fitness, the authority carries out a balance sheet analysis using a special electronic spreadsheet. While this comparative survey was carried out, a database including all the analyses performed by the authority was under design and construction.

Note: (a) The collected data are shown in an anonymous form.

Nevertheless, the main differences arise on the content of the performed analyses and on the proxies that are monitored as indicators of emerging financial problems (see table 3.6, *infra*). Each aviation authority computes and monitors a different set of balance sheet ratios and operational data. In 3 countries (C, I, and O) out of 13, information provided by third parties are also considered. The cases of countries N and O, which adopt enhanced techniques to measure credit worthiness (Altman Z-score), are worth mentioning.

Table 3.6. Proxy indicators of emerging financial problems

Country[a]	Proxies
A	Data that are monthly submitted by air carriers subject to additional economic and financial checks are used as inputs to build a dashboard that includes 6 indicators: a liquidity indicator, an indicator of annual evolution of monthly cash, a monthly turnover indicator, an indicator of annual evolution of monthly turnover, an indicator of annual evolution of monthly flight hours, and an equity indicator.
B	Some key indicators are assessed: turnover, net profit, equity, and liquidity.
C	Borrowing rates and debt structure are monitored. Further information provided by airport management companies, air navigation management, Eurocontrol, handlers, leasers, and other stakeholders are collected and examined. Payment and seizure orders obtained by third parties are also taken into account.
D	Ratio analysis is carried out by accountants of the authority: profitability ratios, activity ratios, liquidity ratios, and gearing ratios. Cash-flows, traffic data, and cost data are also monitored.
E	Proxy indicators of emerging financial problems are equity ratio, financial leverage, quick ratio, flight time, and passenger statistics.
F	A group of ten economic and financial ratios are steadily monitored, thus analyzing financial leverage (long-term debt and debt structure), profitability (equity and assets), capital structure (degree of financial autonomy, coverage of fixed assets, and solvency), and liquidity (general, reduced, and deadline secured liquidity).
G	A crucial role is played by the adequacy of the equity. Key ratios for liquidity and solvency are also computed.
H	The authority steadily monitors the level of equity, revenues and profits, and ratios between assets and liabilities. A crucial role is played by the liquidity position of the company.
I	Proxy indicators to monitor emerging financial problems are third-party information and data, information connected to the AOC, and regular violation of the deadline set up for the submission of the audited accounts.
L	Proxies indicators to detect emerging financial problems are credit information about air carriers and the internal monitoring system based on air carrier financial data of the last 5-6 years.
M	A crucial indicator of emerging financial problems is the working capital. The authority carries out an analysis of the working capital based on the most recent internal management accounts.
N	The authority analyzes the risk of emerging financial problems considering some balance sheet ratios and checking their compliance with standard thresholds. A crucial role is played by solvency ratio, liquidity position, and credit worthiness (computed adopting the Altman Z-score).
O	The authority monitors emerging financial problems, computing some financial indicators (liquidity, profitability, and solidity ratios) and checking their compliance with standard thresholds. The authority also computes an Altman Z-score adapted for air transport. Further information provided by airport management companies, air navigation management, Eurocontrol, and handlers are collected and examined.

Note: (a) The collected data are shown in an anonymous form.

4. Results, discussion, and further research

4.1. The heterogeneous implementation of Reg. 1008/2008

In light of this comparative survey, it is evident that the actions of MSs' aviation authorities for the evaluation of air carriers' financial stability are not uniform in terms of data and information collected among undertakings, of methods and tools adopted, and of indicators monitored. Despite the application of Reg. 1008/2008 being direct, 10 authorities out of 13 adopt national legislation to govern the implementation of this regulation. The lion's share of the surveyed authorities requires special information in addition to those listed in the EU regulation. Eight authorities out of 13 request additional information from new applicants, while 9 request supplementary information from air carriers that undergo the assessment of ongoing financial stability. Finally, 6 authorities ask for additional data also from undertakings that intend to change structure or activities. Furthermore, in some countries, this information have to be provided by filling out special standard forms, thus requiring further elaborations by undertakings. Even the timing to submit the information differs among countries, and 5 authorities ask for the submission of documents more than once during the year. Whereas 11 authorities out of 13 base their control on balance sheet analysis, each of them appraises a very different set of balance sheet indicators. Some of them also adopt special techniques to measure credit worthiness, while others add an in-depth analysis of operational data and of additional information provided by third parties.

This widely heterogeneous implementation of Reg. 1008/2008 results in imposing unequal obligations on undertakings that have the equal right to operate in the European market for air services. First of all, a European air carrier, depending on the MS where it applies to obtain the operating license, may be obliged to submit different documentation and to comply with different deadlines, thus bearing different administrative burdens. Second, and more importantly, the financial fitness of the same European air carrier could be deemed as either complying or not complying with Reg. 1008/2008, because of the different methods, tools, and proxies adopted by different national authorities.

4.2. Fostering harmonization

Indeed, in the regulatory practice, the financial fitness assessment leaves significant discretionary power to aviation authorities in checking the compliance with the European regulation and therefore in granting, refusing, suspending, or revoking an operating license. To foster a greater homogeneity of action, a possible

solution could lie in a further deregulation that aims at eliminating this discretion by repealing the mandatory compliance with financial requirements. This solution relies on a dual assumption — that AOC granting is enough to ensure the safety of air services and that the assessment of technical fitness results in a more objective and non-discretionary procedure. In these circumstances, the main problem would be the allocation of the risk of failure to provide air services in case of air carrier default. Some possible solutions exist. As for many other services whose payment is made in advance, this risk could be left to consumers who could subsequently claim damages by suing the air carrier. An alternative or complementary option, which also deals with the need to repatriate passengers, would require the purchase of an insurance to cover flight cancellation due to company default. Finally, another solution would be the introduction of a tax similar to the "reduced mobility charge,"[23] a lump sum (of a small amount) paid by all passengers in order to create a mutual fund (at national or at European level) that would be used to provide a return flight to those passengers whose flight is cancelled for air carrier default.

The main downside of such a deregulatory push might still be a reduction in the air transport safety, which is the crucial reason to require the financial fitness assessment. Indeed, the necessity to solve financial problems may lead air carriers to reduce investments in safety.[24] From this perspective, Raghavan and Rhoades (2005), confirming results highlighted by Rose (1992), show an inverse relationship between financial performances and accident rates, in particular for small and mid-size carriers, which usually are characterized by weaker financial stability.

Assuming that monitoring financial performances still plays a decisive role for safety, an effective harmonization in the implementation of provisions included in Reg. 1008/2008 is desirable, thus both improving the reliability of the financial

[23] The "reduced mobility charge", is a tax imposed in Europe to all passengers for the provision of air services in a given airport. This tax aims at funding the necessary assistance to disabled passengers who use the airport.

[24] In August 2012, the representative body of German pilots (*Vereinigung Cockpit*) and the European Cockpit Association revealed that cost-cutting practices adopted by several air carriers could be jeopardizing passenger safety, particularly when too strong incentives to limit fuel reserves are provided to pilots. For a broader discussion on the topic, see http://www.eurocockpit.be/stories/20120903/fuelling-the-debate-safety-vs-profitability (last accessed on 11 September 2012) and http://www.tagesschau.de/wirtschaft/ryanairtreibstoff100.html (last accessed on 10 September 2012).

fitness assessment and reducing the existing discretion of each authority. The most obvious way to achieve this outcome is a greater regulatory centralization. From this perspective, Duchene (1995) asks for more specific accounting standards to determine financial fitness. It follows that the European Commission should provide accurate guidelines for carrying out the financial stability assessment, thus harmonizing data collection, selecting financial indicators to be monitored, and setting standard thresholds with which to comply.[25] This solution is less simple than what appears for two reasons. As above explained (see subsection 1.3, *supra*), the debate on performance assessment of air carriers based on financial information is still open and there is not a common agreement on proper financial ratios to be adopted. Furthermore, elements of flexibility (in particular in setting standard thresholds) would be necessary, mainly to consider the impacts that differences in the general economic situation and in the legal framework of MSs have on national air carriers' performances.

For this reason, the most viable approach to improve the harmonization of market entry regulation for air services in the EU seems to be the so-called regulatory co-opetition (Esty and Geradin, 2000), i.e., a mix of competition and cooperation among MSs' aviation authorities under the framework provided by Reg. 1008/2008. Each authority would be able to keep the current independence in performing financial assessment of licensed air carriers.[26] Nevertheless, information flows among national authorities and between them and the European Commission should be improved, thus fostering a continuous and detailed exchange of data, information, and regulatory experiences.[27] Such co-opetition

[25] From a theoretical standpoint, a comparable or even greater harmonization can be achieved by creating a European aviation authority. This option, which also has the same potential downside of enacting a more detailed regulation, seems politically unfeasible in the short-term and therefore, is not further elaborated on in this study.

[26] At the present, the typical downsides, which may stem from regulatory competition, are potentially avoided by the watchdog role given to the European Commission. The Commission should cooperate in monitoring the application of Reg. 1008/2008 (article 26) and is even entitled to deny the right of a Community air carrier to operate intra-Community air services in case its operating license is deemed to not comply with the regulation (article 15), thus preventing a so-called "race to the bottom" among licensing authorities.

[27] Without being exhaustive, several examples of projects that aim at enhancing information flows among authorities can be mentioned. The International Energy Regulation Network (IERN) facilitates information exchange on electricity and natural gas market regulation worldwide. The same role at European level is played by the Council of European Energy Regulators (CEER). Finally, another example is the European Competition Network (ECN), which includes competition authorities of MSs and DG Competition and, among other tasks, improves information exchange among national authorities.

could improve financial fitness assessment under two dimensions. On the one hand, dynamic competition among authorities enables a simultaneous process of "trial and error," which is based on the possibility to compare the effectiveness of different approaches to the financial stability evaluation. On the other hand, cooperation could trigger a learning process among authorities (Van den Bergh, 2000), thus increasing technical and analytic economies of scale and helping to select the most suitable methods, tools, and proxies to perform financial assessment.

The final result of the regulatory co-opetition is likely to be a voluntary harmonization that might be even more effective than uniformity imposed by a stricter regulatory centralization.[28] MSs' aviation authorities might decide to adopt best practices, to select shared financial indicators that are deemed more reliable, and to create a common database, both in order to compare financial fitness of European air carriers and to introduce new scoring techniques, which require a wider set of data and information to work properly. In conclusion, this solution might improve the ability of European aviation authorities to assess the financial stability of air carriers, whose effectiveness might still be questioned.[29]

The main additional information that stems from the comparative survey is the willingness of the respondent authorities to share their knowledge and their interest in the findings of this study. Indeed, regulatory co-opetition is not just desirable, but even demanded by authorities themselves. So far, this paper can be considered as a starting point to foster information exchange, moving one step closer to co-opetition.

4.3. Further research

The principal limitation of this study represents a challenging opportunity for further research. While pointing out the broad variety of procedures and controls implemented, the paper does not assess the impact of such a variety on the

[28] As explained by Van den Bergh (2000, p. 439): "*If states voluntary choose to adapt their legislation to superior rules of competing states, a greater degree of uniformity may be reached*."

[29] Without being exhaustive, between the entry into force of Reg. 1008/2008 and August 2012, in the EU the following airlines went bankrupt (without a timely revocation of the operating license by the competent aviation authority) and cancelled their flights (with a negative impact on passengers who had already purchased tickets): LTE International Airways, SkySouth, Gadair, FlyLAL, Sky Europe, FlyGlobespan, Air Comet, Quantum Air, Highland Airways, Hamburg International, Cirrus Airlines, Spanair, Czech Connect Airlines, Malev Airlines, Cimber Sterling Airlines, Skyways Airlines, City Airline, Air Finland, and Wind Jet.

European aviation market. Indeed, any difference among national authorities in implementing Reg. 1008/2008 might affect their licensing activities. Whereas some authorities could "raise the bar," thus limiting market entry, some other authorities could purposely "lower the bar," thus granting operating licenses to a greater number of undertakings. Furthermore, these differences might affect managerial decisions of air carriers, for instance, by influencing investment choices or even the selection of the country where applying for the license. In light of these considerations, empirical analyses, which aim at investigating the impact of the heterogeneous implementation both on licensing activities and on air carriers' behavior, would certainly provide valuable insights and broaden the horizon of this study.

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The “dark side” of code-sharing - The anticompetitive effects of code-sharing agreements among airlines*

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Keywords

Air transport, airfares, code-sharing agreement, collusion, competition, horizontal agreement.

Abstract

The paper aims at assessing the impact of code-sharing agreements (CSAs) on competition among airlines in the market for non-stop air transport services. The econometric analysis included in the study is based on data drawn from the database "Airline Origin and Destination Survey (DB1B)" compiled by the US Department of Transport. In particular, the possible anticompetitive effects of CSAs are captured by appraising their impact on fares for "restricted coach class" tickets for point-to-point round trip itineraries in the US domestic market during the first quarter of 2012. The presence of a CSA is associated with an increase in airfares between 11.3% and 19.2%, based on different estimation methods. The positive and significant correlation between CSAs and the level of fares can be considered the outcome of price collusion among signatory airlines. For the first time, the "dark side" of CSAs has been spotted and measured, thus providing a valuable insight to competition authorities.

1. Introduction

1.1. Code-sharing agreement, pros and cons

Code-sharing agreement (CSA) is a marketing arrangement among two or more airlines whereby one or more carriers (marketing carriers) adopt their designator codes to sell tickets on a flight which is operated by their partner carrier (operating carrier) (Oum, Park, and Zhang, 1996). From a managerial perspective, this agreement is deemed to be one of the most basic form of cooperation among airlines. The goal of CSA is to generate extra revenues, by supplying additional flights and destinations, and to trigger cost efficiencies, by exploiting economies of traffic density, without any additional investment (Doganis, 2006).

Nevertheless, from a competition law perspective, code-sharing is a horizontal agreement potentially harmful for competition. It might favor collusive behaviors among airlines by enabling the exchange of commercially sensitive information, thus engendering all the typical downsides stemming from cooperation among competitors (European Competition Authorities, 2006). Indeed, CSA may be subject to the scrutiny of competition authorities and forbidden in all the circumstances when the drawbacks of competitive restrictions overwhelm quality and efficiency gains (Oum, Yu, and Zhang, 2001; European Competition Authorities, 2006). To accomplish this task, authorities may certainly benefit from valuable insights provided by the academic literature. Hence, the debate on the topic is vibrant and this paper aims at contributing to this scientific discussion, thus shedding a new light on the anticompetitive effects of CSA.

1.2. A quick overview of the relevant literature

The first contribution which explicitly copes with code-sharing is that of Oum, Park, and Zhang (1996), which provides evidence for pro-competitive effects of CSAs between two followers, in a Stackelberg oligopoly setting.[1] Subsequently, scholars carried out several studies which can be broadly divided into two main groups based on the underlying approach, i.e. analytical and empirical papers, with few overlaps.

Analytical models based on a Cournot oligopoly setting generally account for the effects of outright price cooperation among airlines. Price cooperation among

[1] In this paper, CSA is assumed to increase interline fares, a conclusion which is widely rejected in following studies.

competitors is usually forbidden by competition law, unless an antitrust immunity (ATI)[2] is explicitly granted by the competent competition authority. Therefore, the main findings of these contributions provide theoretical insights only on the impact of CSAs which are supplemented by ATIs. This particular kind of agreements are deemed beneficial for interline[3] passengers because they lead to a reduction of interline fares by removing the double-marginalization problem usually arising when airlines do not cooperate in setting fares for interlining itineraries (Park, 1997; Brueckner and Whalen, 2000; Brueckner, 2001; Brueckner 2003a; Flores-Fillol, 2009). Nonetheless, according to these studies, CSAs with ATI lead to an increase in point-to-point fares[4] between hub airports. The overall effect in terms of conveyed traffic and of surplus depends on the respective size of interline and of inter-hub demand and on the extent of the economies of traffic density.[5]

Only one analytical contribution adopts a Bertrand oligopoly setting and provides an analysis of CSA in the absence of explicit price cooperation (Bilotkach, 2005). In this paper, CSA without ATI is considered to have the same beneficial effects as CSA with ATI on interline passengers, in terms of fare reduction. Furthermore, no impact on inter-hub fares is engendered, thus avoiding the anticompetitive drawbacks of ATI granting. On the contrary, Czerny (2009) points out that CSAs without ATI may result in higher fares for passengers who fly only on a point-to-point leg of a broader interline route.

The empirical analyses have extensively addressed not only the impact of CSA, but also of broader forms of cooperation among airlines, such as alliances and ATIs, on interline itineraries. Park and Zhang (2000) assess the impact of four global alliances, concluding that while alliances among carriers that are not direct competitors may engender benefits for consumers, alliances among direct competitors are likely to reduce total output and consumer surplus. Consistently

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[2] An ATI, granted by an antitrust authority, usually allows the involved carriers to coordinate schedules and networks, to cooperate on fare setting, and to share revenues and costs, thus bypassing competition law in force.

[3] An interline route is an itinerary which include multiple legs (connections) operated by two or more carriers.

[4] Point-to-point airfares are paid by passengers who fly directly from a point A to a point B without any intermediate stop (non-stop route).

[5] Economies of traffic density explain a reduction of the marginal cost (MC) of production when output increases, given the production technology, the size of the network, and input prices. In a nutshell, when economies of traffic density exist, MC function of airlines is positive and decreasing at increasing rates.

with theoretical findings stemming from a Cournot setting, further studies point out that CSAs, alliances, and ATIs heavily reduce interline fares (Brueckner and Whalen, 2000; Brueckner, 2003a and 2003b; Whalen, 2007; Ito and Lee, 2007; Brueckner, Lee, and Singer, 2011).

Empirical contributions which consider the effects of CSAs on non-stop itineraries are less common. In line with analytical models which predict a positive impact of CSAs on inter-hub (point-to-point) fares (Park, 1997; Brueckner, 2001), Brueckner and Whalen (2000) detect a 5% increase in these fares due to CSAs, although this coefficient is not statistically significant. Gillespie and Richard (2011) partially confirm this result for "economy class"[6] tickets, showing that an ATI (outright price cooperation) between two carriers on a route where they compete with each other is equivalent to the exit of one competitor from the market. On the contrary, by focusing on a case study in the United States (US) market, Gayle (2008) finds no evidence of collusion on routes served by direct competitors which enter into multiple CSAs.

1.3. Research question

Analytical models suggest that CSAs are able to decrease interline fares, but also to increase point-to-point fares, therefore their final impact on consumer and total welfare is ambiguous. While several pieces of evidence have been collected with regard to the positive impact of CSAs on interline fares, the effects of these agreements on point-to-point fares have mostly been neglected by the majority of the empirical literature. Acknowledging this research gap, this paper aims at providing competition authorities with new and valuable insights by appraising the impact of CSAs among airlines on competition in the market for non-stop air transport services. In particular, the anticompetitive effects of CSAs are detected by assessing the impact of these agreements on fares paid in the US domestic market by passengers who travel in "coach class" and mostly during off-peak season.

The paper is divided into three main parts. The first part (section 2) describes methods and material adopted to perform an econometric analysis aiming at estimating a regression equation that relates point-to-point airfares to CSAs among air carriers and to other independent variables. The second part (section 3) reports and discusses the empirical results of the econometric analysis. Lastly, a

[6] The authors focus on "restricted coach class" (*X* class) tickets.

conclusive section (4) recaps the main findings of the study and suggests further research.

2. Materials and methods

2.1. Basic regression model, dependent variable, and time horizon

To assess the impact of CSAs on competition among airlines in the market for non-stop air transport services, this paper estimates a regression equation that relates point-to-point fares for "restricted coach class" tickets to existing CSAs. The basic regression, which includes also additional independent variables, is of the following form:

Airfares = f(Airport Features, Market Features, Route features, Ticketing Carrier Features, Operating Carrier Features, Competition Measures, Code-sharing agreements).

The starting point to select the appropriate dependent variable is the positive alleged association between CSAs and collusion. Accordingly, in case a CSA enables collusive behaviors among signatory airlines, the effects of this collusion will affect the main drivers of competition in the air service market. In this industry, competition is multidimensional and several attributes are able to influence passengers' choices, such as price, quality of the service, number of destinations served, flight frequency, customer loyalty, and so on (Proussoglou and Koppelman, 1999). In particular, price is just one among many levers which airlines can use to compete. The relative importance of each lever depends on the characteristics of the market segment targeted. Keeping in mind this distinctive feature of air transport service, collusion is expected to directly affect airfares in all the circumstances where price is a significant competitive variable.

Indeed leisure passengers who fly in "coach class" are characterized by the highest price sensitivity and attribute a limited value to improvements in the level of service (Proussaloglou and Koppelman, 1999; Brons et al., 2002). Therefore, in this market segment, collusion among airlines is mostly like to lead to a softer price competition and to higher airfares, being price the main competitive variable. Price collusion is supposed to be particularly evident on fares paid by passengers who travel in "restricted coach class", i.e. the fare class that is characterized by the lower level of service and includes the cheapest tickets sold by airlines. Hence, if CSAs enable collusion among airlines and if collusion softens price competition in the leisure market segment, a positive correlation between CSAs and the level of fares for "restricted coach class" tickets could be found.

In light of these considerations, the dependent variable (*lnfare*) adopted in the regression equation is the natural logarithm[7] of a weighted average airfare (see paragraph 2.2., *infra*) paid by passengers who purchase "restricted coach class" (*X* class) tickets for point-to-point round trip itineraries.[8] Furthermore, unlike most of the previous studies on the topic (Brueckner & Whalen, 2000; Brueckner, 2003a; Ito & Lee, 2007; Whalen, 2007), the analysis is based on flights operated during the first quarter of the year. This quarter is largely off-peak, hence price competition is expected to be stronger, due to excess capacity available, and the gap between fares set under competition and fares set under collusion is expected to be wider.

2.2. Main data

Data for the empirical analysis are drawn from the database "Airline Origin and Destination Survey (DB1B)" compiled by the US Department of Transport (US DoT).[9] DB1B has been collecting information about a 10% of US domestic flights since 1993 on a quarter basis. In particular, this paper analyzes data referring to the first quarter of 2012.

The online version of DB1B provides data for each US domestic itinerary surveyed and is divided into three different tables:

1. DB1B Coupon, which comprises coupon specific information; [10]
2. DB1B Market, which comprises directional market specific information;[11]
3. DB1B Ticket, which comprises itinerary specific information. [12]

By using a database management system and by focusing on DB1B Ticket, only the itineraries with the following features have been included in the sample used for the regression:

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[7] Log transformation for this variable is consistent with all previous empirical studies on the topic.

[8] One-way point-to-point itineraries are excluded from the empirical analysis because pricing strategies for this kind of flights sharply differ from the one adopted for round trip flights.

[9]Data are available on the website www.transtats.bts.gov/DatabaseInfo.asp?DB_ID=125&DB_Name=Airline%20Origin%20and%20Destination%20Survey%20(DB1B), last accessed on 5 August 2012.

[10] Considering a round trip from A to C with an intermediate stop in B, DB1B Coupon includes a different observation for each of the 4 legs included (A-B, B-C, C-B, B-A).

[11] Considering a round trip from A to C with an intermediate stop in B, DB1B Market includes a different observation for each directional market included (A-C, C-A).

[12] Considering a round trip from A to C with an intermediate stop in B, DB1B Ticket includes a single observation for the whole itinerary (A-B-C-B-A).

- Flight tickets are round trip tickets with two coupons, thus including only point-to-point round trip itineraries; [13]
- Fare values are considered credible by the US DoT;
- Fare values are higher than 20$, thus reducing the number of observations which report fares subject to special discount (tickets purchased by employees of the air carrier, tickets purchased by redeeming miles of frequent flyers program, and so on);
- Fare class is equal to *X*, i.e. "restricted coach class", thus excluding "business class" and "first class" tickets as well as "unrestricted coach class" tickets[14].

Information on selected itineraries is completed by adding further details reported in DB1B Coupon and DB1B Market. The final result of this process is a data set focused on "restricted coach class" tickets for US domestic point-to-point round trip itineraries. In particular, the following information is provided:

- Origin airport, i.e. the airport where the round trip starts (IATA code);
- Destination airport, i.e. the airport where the first leg of the round trip ends (IATA code);
- Origin city market, i.e. the catchment area of the airport where the round trip starts;
- Destination city market, i.e. the catchment area of the airport where the first leg of the round trip ends;
- Ticketing carrier, i.e. the company selling the flight ticket (IATA code);
- Outbound operating carrier, i.e. the company operating the first leg of the round trip (IATA code);
- Inbound operating carrier, i.e. the company operating the second leg (return flight) of the round trip (IATA code);
- Miles flown, i.e. the total distance flown including both outbound and inbound flight;
- Airfare;
- Number of passengers who have paid the same airfare.

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[13] See note 8, *supra*.

[14] For the first quarter of 2012, DB1B surveyed 2,342,065 tickets for point-to-point round trip itineraries, the 81% of them were "restricted coach class" tickets.

Before starting the empirical analysis, an additional elaboration is required. All the itineraries which are characterized by the same origin airport, the same destination airport, the same ticketing carrier, the same outbound operating carrier, and the same inbound operating carrier are collapsed in a single observation by computing a passenger-weighted average airfare. *Lnfare*, i.e. the dependent variable, is the natural logarithm of the resulting average fares paid by customers who purchased a "restricted coach class" ticket. Previous empirical analyses adopted the same methods to calculate weighted average fares, but observations for "business class" and/or "unrestricted coach class" were also incorporated in the computation (Brueckner, 2001; Brueckner, 2003a; Ito & Lee, 2007; Whalen, 2007), thus including data on market segments where price is not the main competitive variable.

2.3. Independent variables

2.3.1. Airport features

While, in the US domestic market, airports cannot be considered a barrier to entry,[15] there are still some variables related to these infrastructures that may affect airfares. The effects of two airport features, i.e. airport charges and fees and "airport dominance", are empirically tested in this study.

First, airport charges and fees are included in airfares reported in DB1B. According to the Federal Aviation Administration (FAA) Act of 1994, each commercial service airport has to annually file financial reports with the FAA. These information are collected in the so-called Compliance Activity Tracking System (CATS)[16] and are available to the public. For each airport the ratio in 2011 between the passenger airline aeronautical revenues and the total number of enplaned passengers has been computed. This ratio is a proxy of the average airport charges and fees levied on each passenger. It is in general higher for the most congested airports. The natural logarithm (*lnairports*) of the sum (*airports*) of airline aeronautical revenues per passenger charged in the origin and in the destination airport is included in the regression equation as an independent variable.

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[15] In the US, slot allocation is coordinated only in four airports: New York JFK (fully coordinated, level 3); Newark EWR (fully coordinated, level 3); San Francisco SFO (slot controls only at peak times, level 2); Chicago ORD (slot controls only at peak times, level 2). Therefore, only two US airports (and only a single city market) experience capacity constraints which can be considered a barrier to entry for newcomers.

[16] Data are available on the website cats.airports.faa.gov, last accessed on 15 August 2012.

Second, a dominant share of traffic served by an air carrier at a given airport is proved to be a source of competitive advantage, thus being associated with higher fares (Borenstein, 1989). For each airport and for each company, an "airport dominance" variable is measured by computing the market share of each ticketing carrier that serves the airport. This market share is based on all the observations included in DB1B Ticket (first quarter 2012) and is calculated by dividing the total number of passengers enplaned by a given ticketing carrier in a given airport by the total number of passengers enplaned in the same airport. Two independent variables are considered in the regression analysis, i.e. the "airport dominance" market share of the ticketing carrier at the origin airport (*orairdom100*) and the "airport dominance" market share of the ticketing carrier at the destination airport (*destairdom100*).

2.3.2. Market and route features

Features of market demand can affect fare setting and are incorporated in the empirical analysis by measuring independent variables for each directional city-pair market. A directional market includes all the point-to-point round trip itineraries from a given city market to another given city market (and back).[17] Statistical data for city markets, that are geographic zones including all the airports whose catchment areas overlap, are provided by the US Bureau of Economic Analysis[18] and by the US Census Bureau.[19]. Focusing on the last available information (updated to 2010[20]), demand effects are captured by adding to the regression equation four variables, i.e. the natural logarithm (*lnorpop*) of the origin city market population (*orpop*), the natural logarithm (*lndestpop*) of the destination city market population (*destpop*), the natural logarithm (*lnorpinc*) of the origin city market per capita income (*orpinc*), and the natural logarithm (*lndestpinc*) of the destination city market per capita income (*destpinc*).

[17] Round trip itineraries from A to B (A-B-A) and round trip itineraries from B to A (B-A-B) are part of different directional markets.

[18] Data are available on the web-site www.bea.gov, last accessed on 10 August 2012.

[19] Data are available on the web-site www.census.gov, last accessed on 10 August 2012. For Puerto Rico and the islands areas data are published in section 29 of "The 2012 Statistical Abstract", available online at www.census.gov/prod/2011pubs/12statab/outlying.pdf, last accessed on 20 August 2012.

[20] More recent information is not available. Nevertheless these variables refer to slow-changing data.

Furthermore, considering that routes included in the same directional city-pair market can be characterized by differences in the distance flown[21] and that longer itineraries are associated with higher fares, the natural logarithm (*lndistance*) of the miles flown (*distance*) is incorporated in the analysis as a route-specific independent variable.

2.3.3. Ticketing carrier and operating carrier features

To account for differences in cost structures among airlines that may explain differences in airfares, a continuous variable measuring airline cost efficiency is included in the analysis. The US DoT database "Air Carrier Financial Reports"[22] provides information about operating expenses and miles flown in 2011 for the majority of US airlines. The ratio between the two may be considered an indicator of cost efficiency. Nevertheless, this ratio would penalize airlines which mainly operate short-haul routes, considering that take-off and landing determine high fixed costs. A study carried out by Steer Davies Glave (2007) for the European Commission explains that costs for take-off and landing are equivalent to about 900 km flown. Hence, total miles flown by each airline are adjusted by adding 560 miles for each take-off performed. As a result, operating expenses per adjusted-mile flown have been computed for any airline. Therefore, two further independent variables have been added to the regression equation, i.e. the natural logarithm (*lntckoe*) of the operating expenses per adjusted mile flown of the ticketing carrier (*tckoe*) and the natural logarithm (*lnopoe*) of the average[23] operating expenses per adjusted-mile of the operating carriers (*opoe*). These variables are a good proxy not only for cost efficiency, but also for business model adopted by airlines, acknowledging that regional carriers included in the sample are characterized by the lower operating expenses per adjusted-mile, low cost carriers by an intermediate level, while full-service carriers by the higher expenses.

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[21] City markets includes all the airports whose catchment area are overlapped. Round trip routes from airport x (included in the city market A) to airport y (included in the city market B) and round trip routes from airport z (included in the city market A) to airport y are part of the same directional market, but can be characterized by differences in the distance flown.

[22] Data are available on the website: www.transtats.bts.gov/Tables.asp?DB_ID=135&DB_Name=Air%20Carrier%20Financial%20Reports, last accessed on 7 August 2012.

[23] A simple average is computed because in a point-to-point round trip flight, the outbound distance – operated by the outbound operating carrier- can be considered equivalent to the inbound distance – operated by the inbound operating carrier.

Despite operating costs per adjusted-mile can be considered a good proxy both for cost efficiency and quality of the service, other differences across companies can affect airfare setting. To capture these airline specific effects (fixed effects), previous empirical analyses adopted dummy variables for each air carrier included in the sample (Brueckner, 2001; Brueckner, 2003a; Ito & Lee, 2007). The same approach is followed in this paper by extending the basic regression model, thus excluding *lntckoe* and *lnopoe* and including dummies not only for each ticketing carrier, but also for each outbound and inbound operating carrier. The results stemming from this approach are better suited to draw comparisons with previous studies.

2.3.4. The code-sharing agreement variable

The database DB1B provides IATA codes of ticketing carriers, of outbound operating carriers and of inbound operating carriers. In case the ticketing carrier differs from the operating carrier, a CSA usually exists. Nevertheless, in the US market the so-called regional carriers either are wholly owned by or are affiliated to full-service carriers, thus operating flights as subcontractors (Forbes and Lederman, 2007). This creates a potential problem. On the one hand, even if the ticketing and the operating carrier are different companies, a flight which is marketed by a full-service carrier and is operated by its subcontractors cannot be included in the basic definition of CSA. On the other hand, a flight operated by regional carriers and marketed by a full-service carrier different from the one they are affiliated to is still a case of CSA. Acknowledging this difference, the affiliation schemes of all the regional carriers included in the selected data set have been detected. In light of this analysis and considering the definition provided by Brueckner (2003a) and by Brueckner, Lee, and Singer (2011), a CSA dummy (*csadummy*) has been generated which is equal to 1 only if the ticketing carrier differs from the outbound and/or the inbound operating carriers and at least one of this operating carriers is not a regional carrier affiliated to the ticketing one. This independent variable is able to capture the effect of CSAs on airfares and to reveal the alleged collusive behaviors among signatory airlines.

2.3.5. Competition measures

The impact of the "level of competition" on fares in a city-pair market is captured in the empirical analysis by adding three additional independent variables. First, competition is measured through the number of both ticketing carriers (*competitors_ticketing*) and operating carriers (*operating_competitors*) which provide point-to-point round trip service in a given directional city-pair market.

While the variable *competitors_ticketing* is a proxy of the number of companies which sell tickets in the market, i.e. the number of different suppliers among which consumers can actually choose, the *operating_competitors* variable includes also regional carriers and provides a broader definition of competition. Second, competition is also measured by computing the Herfindahl Hirschman Index (HHI) in the city-pair market (*routeHHI*). The share of passengers enplaned by a given ticketing air carrier in a directional city-pair market is adopted as market share to calculate the HHI.

2.4. Summary statistics

Table 2.1 reports the summary statistics of all the variables considered in the analysis. While the regression equation includes natural logarithms for some of the variables, to provide more valuable information this tables focuses on the same variables before log transformation.

The selected data set comprises 18,694 itineraries. Nevertheless, the number of observations for which operating expenses for adjusted-mile of ticketing carriers and of operating carriers are also available is slightly lower (17,455), because balance sheet data of five regional carriers and one full-service carrier are not available. Focusing on the *csadummy* variable, 1,103 itineraries (6%) over 18,694 are characterized by a CSA (for the definition of CSA adopted in this study, see section 2.3.4., *supra*); the same percentage of CSAs is registered across the observations which includes carriers' operating expenses.

In addition, a subsample is selected by excluding all the itineraries where the operating carrier is a regional carrier affiliated to the ticketing one.[24] This subsample includes 5,601 observations and 826 cases of CSA (15%). Also in this circumstance, the percentage of CSAs is comparable (14%) when considering only observations for which operating expenses per adjusted-mile are available (5,577).

[24] Please, note that in this subsample regional carriers are still present in all the observations where they are not affiliated to the ticketing one. In this circumstances, it is likely that a CSA exists between the ticketing carrier and the full-service carrier to which the regional one is affiliated.

Table 2.1. Summary statistics

Variable	Observations	Mean	Standard Deviation	Min	Max
fare ($)	18.694	457,90	208,98	21,00	2.331,00
airports ($)	18.694	18,70	7,18	2,49	47,58
orpop	18.694	4.229.937,00	4.354.720,00	5.854,00	18.900.000,00
orpinc ($)	18.694	42.883,84	6.972,48	8.000,00	87.614,00
destpop	18.694	4.120.784,00	4.307.569,00	5.854,00	18.900.000,00
destpinc ($)	18.694	42.648,84	7.045,62	8.000,00	87.614,00
tckoe ($)	17.455	19,76	5,13	2,18	25,01
opoe ($)	17.455	8,89	6,62	1,26	25,00
distance (miles)	18.694	1.420,81	1.034,68	110,00	14.720,00
csadummy	18.694	0,06	0,24	0,00	1,00
competitor_ticketing	18.694	2,75	1,72	1,00	9,00
operating_competitors	18.694	5,41	3,37	1,00	17,00
routehhi	18.694	0,68	0,27	0,18	1,00
orairdom100 (%)	18.694	34,13	23,85	0,00	100,00
deairdom100 (%)	18.694	32,64	23,88	0,00	100,00

3. Empirical evidence

3.1. Approach #1, air carriers' operating expenses per adjusted-mile

As explained in section 2.3.3. (*supra*), ticketing carrier and operating carrier features are included in the basic regression model by adopting two different approaches, thus leading to two different specifications of the regression equation.

The first equation includes air carriers' operating expenses per adjusted-mile and is of the following form:

$$\begin{aligned} lnfare_j = \beta 0 \quad & + \beta_1 lnairports_j + \beta_2 lnorpop_j + \beta_3 lnorpinc_j + \beta_4 lndestpop_j \\ & + \beta_5 lndestpinc_j + \beta_6 lntckoe_j + \beta_7 lnopoe_j + \beta_8 lndistance_j \\ & + \beta_9 competitors\_ticketing_j + \beta_{10} operating\_competitors_j \\ & + \beta_{11} routehhi_j + \beta_{12} orairdom100_j + \beta_{13} destairdom100_j \\ & + \beta_{14} csadummy_j + \epsilon_j \end{aligned}$$

where *j* identifies a given itinerary.

The empirical results of this model specification are shown in table 3.1 (*infra*). Column A.1.1 and A.1.2 show coefficients estimated by adopting the ordinary least squares (OLS) method and by including all the itineraries of the data set. The first estimation is based on robust standard errors, whereas the second on clustered standard errors. More precisely, in the second estimation, each cluster correspond to a given directional market and this approach improves the accuracy of the model in capturing the effects of independent variables (market features and competition measures) which vary only across directional markets. Both regressions provide identical values for coefficients, corroborating the robustness of the regression outcomes.

The most interesting result is provided by the *csadummy* variable coefficient that is equal to 0.157 and significant at the 1% level. In other words, an itinerary characterized by a CSA is associated with airfares which are about 16% higher. As predicted by analytical models (see section 1.2, *supra*), CSAs lead to an increase in point-to-point fares. The detected effect can be considered the outcome of price collusion among airlines that enter a CSA. For all the other variables included in the equation, coefficient signs are in line with expected results with two exceptions (*lnopoe* and *operating_competitors*) which will be further discussed below.

Focusing on market-specific features, the size of the origin market population (*lnorpop*) has a positive and significant effect on fares, which is slightly higher than the one estimated for the destination market population (*lndestpop*). While in the regression with robust standard errors, the impact of an increase in the per capita income of the origin market (*lnorpinc*) is positive and significant, this variable is not significant in the clustered regression. Per capita income of the destination market *(lndestpinc*) is not significant in both cases.

The coefficients of the variables capturing airport features confirm the role played by airport dominance. As expected, higher ticketing carriers' market shares in the origin (*orairdom100*) as well as in the destination airport (*destairdom100*) are associated with higher airfares. Also the coefficients for airport charges and fees (*lnairports*) is positive and significant.

The first counterintuitive result is provided by one of the competition measures controlled in the equation. Whereas an additional ticketing competitors (*competitors_ticketing*) is associated with 8% lower fares and more concentrated markets (higher HHI, *routehhi*) are correlated with higher prices, an additional operating competitors (*operating_competitors*) is associated with a small but

significant increase in airfares. A closer look at the data set reveals that the number of operating carriers is greater than the number of ticketing ones in the markets where regional carriers operates, i.e. on itineraries that are usually characterized by a narrow demand (Forbes and Lederman, 2007). In these markets, given demand size and the high number of operating carriers, it is likely that the entry of an additional competitor triggers a reduction in load factors and an increase in marginal costs for all the companies which operate on the same route, thus leading to an increase in price.

The second counterintuitive result arises from variables capturing air carrier features. As expected, an increase in operating expenses per adjusted mile of ticketing carriers (*lntckoe*) is correlated to a sharp increase in airfares. This results is consistent with full-service carriers (which have the highest operating costs) setting a premium price for their flights and low cost carriers providing low fares air services. Surprisingly, an increase in operating expenses of operating carriers (*lnopoe*) is associated with a reduction in fares. Again regional carriers have a crucial role in explaining this result. These companies, which are characterized by the lowest operating costs per adjusted-mile, do not directly set airfares for the itineraries they serve. These airfares are instead fixed by their full-service carrier partners. This particular pricing policy affects the outbound and/or the inbound leg of 11,878 itineraries out of 17,455 included in the regression analysis. As a result, at very low operating expenses correspond fares comparable to the one set by full-service companies in about the 70% of the sample. In line with this consideration, the *lnopoe* coefficient is not significant when estimating the regression equation on the subsample where all the observations with regional carrier operating as a subcontractor are excluded (see columns A.2.1 and A.2.2 of table 3.1, *infra*). Also in this case, the *csadummy* variable is positive and significant and a CSA itinerary is associated with airfares that are about 20% higher.

Finally, columns A.1.3 and A.2.3 (see table 3.1, *infra*) respectively repeat the analyses provided in columns A.1.1 and A.2.1 by adopting a weighted least square (WLS) regression method. The adoption of a passenger-weighted average airfare as the dependent variable may lead in fact to heteroskedastic error terms; using the number of passengers included in each observation as a weight in a WLS regression is an effective remedy to this problem (Brueckner, 2003). Even by applying this method, coefficients are comparable to the one that stem from the original OLS regressions and the *csadummy* variable is still positive and significant. This is a further corroboration of the robustness of the regression outcomes.

Table 3.1. Results of the regression with air carriers' operating expenses per adjusted-mile

	A.1.1	A.1.2	A.1.3	A.2.1.	A.2.2.	A.2.3.
	OLS[a]	OLS[b]	WLS[a]	OLS[b]	OLS[c]	WLS[a]
lnairports	0.06	0.06	0.062	0.069	0.069	0.079
	(0.010)**	(0.018)**	(0.010)**	(0.016)**	(0.018)**	(0.017)**
lnorpop	0.045	0.045	0.046	0.022	0.022	0.021
	(0.003)**	(0.005)**	(0.003)**	(0.004)**	(0.005)**	(0.005)**
lnorpinc	0.077	0.077	0.072	0.132	0.132	0.129
	(0.023)**	-0.041	(0.023)**	(0.033)**	(0.043)**	(0.035)**
lndestpop	0.032	0.032	0.034	0.016	0.016	0.019
	(0.003)**	(0.005)**	(0.003)**	(0.004)**	(0.005)**	(0.005)**
lndestpinc	0.032	0.032	0.023	0.093	0.093	0.073
	(-0.022)	(-0.039)	(-0.023)	(0.032)**	(0.042)*	(0.035)*
lntckoe	0.54	0.54	0.539	0.44	0.44	0.441
	(0.009)**	(0.012)**	(0.010)**	(0.019)**	(0.021)**	(0.020)**
lnopoe	-0.042	-0.042	-0.039	-0.013	-0.013	-0.012
	(0.004)**	(0.005)**	(0.004)**	-0.016	-0.017	-0.016
lndistance	0.288	0.288	0.285	0.334	0.334	0.332
	(0.006)**	(0.009)**	(0.006)**	(0.009)**	(0.010)**	(0.009)**
csadummy	0.157	0.157	0.162	0.196	0.196	0.187
	(0.013)**	(0.017)**	(0.013)**	(0.017)**	(0.020)**	(0.017)**
competitors_ticketing	-0.077	-0.077	-0.078	-0.069	-0.069	-0.071
	(0.003)**	(0.007)**	(0.003)**	(0.004)**	(0.006)**	(0.004)**
operating_competitors	0.017	0.017	0.017	0.02	0.02	0.022
	(0.001)**	(0.003)**	(0.002)**	(0.003)**	(0.005)**	(0.003)**
routehhi	0.186	0.186	0.187	0.072	0.072	0.068
	(0.017)**	(0.036)**	(0.018)**	(0.025)**	(0.033)*	(0.028)*
orairdom100	0.003	0.003	0.003	0.003	0.003	0.003
	(0.000)**	(0.000)**	(0.000)**	(0.000)**	(0.000)**	(0.000)**
destairdom100	0.003	0.003	0.003	0.003	0.003	0.003
	(0.000)**	(0.000)**	(0.000)**	(0.000)**	(0.000)**	(0.000)**
constant	-0.193	-0.193	-0.078	-0.968	-0.968	-0.762
	(-0.357)	(-0.623)	(-0.368)	(-0.516)	(-0.644)	(-0.554)
NUMBER OF OBSERVATIONS[d]	17,455	17,455	17,455	5,577	5,577	5,577
R-SQUARED	0.36	0.36	0.34	0.47	0.47	0.45

Notes: (*) Significant at 5%; (**) Significant at 1%; (a) Robust standard errors in parentheses; (b) Standard errors adjusted for 4,068 clusters. Each cluster correspond to a single directional market; (c) Standard errors adjusted for 2,794 clusters. Each cluster correspond to a single directional market; (d) Observations with empty values for *lntckoe* and *lnopoe* are excluded from the regression.

3.2. Approach #2, air carriers' dummies

To include air carrier-specific effects, the second regression equation adopts an approach that has already been followed in previous empirical analyses (Brueckner, 2001, 2003a; Ito & Lee, 2007). In the new equation air carriers' operating expenses are excluded, while dummy variables both for ticketing carriers and operating carriers are included. Each observation has 90 additional variables, a dummy (from $a1$ to $a17$) for each ticketing carrier[25] comprised in the sample, a dummy (from $b1$ to $b36$) for each outbound operating carrier, [26] and a dummy (from $c1$ to $c37$) for each inbound operating carrier. [27] As a result, the regression equation is of the following form:

$$\begin{aligned} lnfare_j = \beta_0 &+ \beta_1 lnairports_j + \beta_2 lnorpop_j + \beta_3 lnorpinc_j + \beta_4 lndestpop_j \\ &+ \beta_5 lndestpinc_j + \beta_6 lndistance_j + \beta_7 competitor\_ticketing_j \\ &+ \beta_8 operating\_competitors_j + \beta_9 routehhi_j + \beta_{10} orairdom100_j \\ &+ \beta_{11} destairdom100_j + \beta_{12} csadummy_j + \beta_{13} a1_j + \cdots + \beta_{29} a17_j \\ &+ \beta_{29} b1_j + \cdots + \beta_{65} b36_j + \beta_{66} c1_j + \cdots + \beta_{102} c37_j + \epsilon_j \end{aligned}$$

where *j* identifies a given itinerary.

The outcomes provided in this section have two positive implications. First, the impact of all the existing differences across air carriers on airfares is captured, thus going beyond efficiency and quality measured through operating expenses per adjusted-mile; second, the estimated coefficients can be directly compared to the ones computed in other studies which use the same approach.

Coefficients estimated adopting this model specification are showed in table 3.2 (*infra*).[28] Estimations in column A.3.1. are the outcome of an OLS regression with robust standard errors, based on all the itineraries that are part of the data set[29]

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[25] The total number of ticketing carriers included in the sample is equal to 18. To avoid multicollinearity, 17 dummies are used.

[26] The total number of outbound operating carriers included in the sample is equal to 37. To avoid multicollinearity, 36 dummies are used.

[27] The total number of inbound operating carriers included in the sample is equal to 38. To avoid multicollinearity, 37 dummies are used.

[28] All the regressions include air carrier dummies, but coefficients for these variables are not of interest to the research question, hence they are not reported in table 3.2. The complete analysis is on file with the author.

[29] The number of observations, 18,694, is higher if compared with regressions in table 3.1 (*supra*), because operating expenses for some air carriers are not available, therefore some itineraries are skipped when adopting the approach of section 3.1 (*supra*).

and should be compared to coefficients included in column A.1.1 of table 3.1 (*supra*). The *csadummy* variable coefficient remains positive, significant, and equal to 0.15. In column A.3.2, coefficients are estimated with a WLS approach and no differences arise compared to the OLS method.

Table 3.2. Results of the regression with air carriers' dummies

	A.3.1	**A.3.2**	**A.4.1**	**A.4.2**
	OLS[a]	WLS[a]	OLS[a]	WLS[a]
lnairports	0,043	0,045	0,006	0,013
	(0.010)**	(0.010)**	-0,014	-0,016
lnorpop	0,044	0,046	0,02	0,021
	(0.003)**	(0.003)**	(0.004)**	(0.004)**
lnorpinc	0,014	0,011	0,014	0,006
	-0,022	-0,022	-0,029	-0,032
lndestpop	0,03	0,033	0,013	0,014
	(0.003)**	(0.003)**	(0.003)**	(0.004)**
lndestpinc	-0,032	-0,036	-0,017	-0,03
	-0,021	-0,022	-0,027	-0,03
lndistance	0,299	0,295	0,346	0,34
	(0.005)**	(0.006)**	(0.007)**	(0.008)**
csadummy	0,15	0,152	0,124	0,113
	(0.013)**	(0.013)**	(0.017)**	(0.018)**
competitors_ticketing	-0,074	-0,076	-0,055	-0,055
	(0.003)**	(0.003)**	(0.004)**	(0.004)**
operating_competitors	0,017	0,018	0,018	0,019
	(0.001)**	(0.002)**	(0.002)**	(0.003)**
routehhi	0,22	0,22	0,169	0,164
	(0.017)**	(0.018)**	(0.023)**	(0.026)**
orairdom100	0,003	0,003	0,002	0,002
	(0.000)**	(0.000)**	(0.000)**	(0.000)**
destairdom100	0,003	0,003	0,002	0,002
	(0.000)**	(0.000)**	(0.000)**	(0.000)**
constant	2,509	2,577	1,912	2,138
	(0.343)**	(0.356)**	(0.429)**	(0.476)**
OBSERVATIONS	18694	18694	5601	5601
R-SQUARED	0,42	0,4	0,64	0,61

Notes: (*) Significant at 5%; (**) Significant at 1%; (a) Robust standard errors in parentheses. The regression includes also air carriers' dummy variables.

Finally, column A.4.1 shows the results of an OLS regression estimated on the subsample where regional air services are excluded. The coefficient which captures the impact of CSA (*csadummy*) is still positive and significant, albeit the magnitude of this effect is slightly lower (0.124). Also the robustness check provided in column A.4.2, setting out the outcomes of a WLS regression on this smaller sample, is favorable to the collusion hypothesis, with the *csadummy* variable coefficient significant and equal to 0.113.

4. Conclusions

This paper has estimated the effect of CSAs on the level of fares for "restricted coach class" tickets for point-to-point round trip itineraries in the US. The presence of a CSA is associated with an increase in airfares that ranges between 11.3% and 19.2%, based on different estimation methods. The positive and significant correlation between CSAs and the level of fares can be considered the explicit outcome of price collusion among signatory airlines. For the first time, the "dark side" of CSA has been spotted and measured, thus providing empirical evidence of the anticompetitive effects of these agreements on point-to-point itineraries and offering a valuable insight to competition authorities which are required to assess the overall impact of CSAs.

This novel result is probably due to the different perspective adopted in this study. The performed empirical analysis is centered on "restricted coach class" fares, on flights operated during the first quarter of the year, and on the US domestic market. These three aspects have particular advantages for competition analysis. First, "restricted coach class" tickets are directed to a market segment where fares are more likely to grow in case of collusion among airlines. Second, during the first quarter the difference between airfares set under competition and airfares set under collusion is expected to be wider because of available capacity. Third, the exclusive focus on the US domestic market enables to assess the effect of CSAs among actual and potential competitors, whereas studies on international routes include also air carriers that cannot compete with each other due to regulatory barriers to the international traffic.

The limitations of this study represent challenging research opportunities for air transport scholars and practitioners. First, the results provided in this paper could be supplemented by a panel data analysis based on a wider sample drawn from the DB1B. Second, the detected price increase might be offset by quality and efficiency gains. Further empirical analyses aiming at assessing the relationship between

CSAs and quality indicators could contribute to complete the set of information resources available to competition authorities. Third, this study, as well as previous empirical and analytical contributions, is not able to capture the effects of different kinds of arrangements which are included in CSAs ("free sale", "hard block", "soft block", and so on). Future research should focus on these contractual arrangements to identify which solution enables quality and efficiency gains without triggering strong anticompetitive downsides.

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