

# Economic deregulation and transport safety: A synthesis of evidence from evaluation studies

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Received 2 February 2005; received in revised form 5 April 2005; accepted 12 December 2005

## Abstract

This paper presents a synthesis of evidence from studies that have evaluated the impacts of economic deregulation on transport safety. Most of these studies refer to aviation or road transport. Very few studies deal with deregulation of rail transport. There are no studies of maritime transport, which has never been regulated the same way as other modes of transport. The review includes studies that have attempted to quantify the impacts of transport deregulation on transport safety. Each study contains one or more estimates of the effect on transport safety of deregulation. Summary estimates of effect have been derived from the individual estimates of effect by means of meta-analysis. Airline deregulation, which has only been evaluated in the United States, does not appear to influence the safety of air travel. Deregulation of road transport has been evaluated in several countries. The summary estimate of effect indicates that no statistically significant changes in road safety have occurred as a result of deregulation. Deregulation of rail transport has only been evaluated in Great Britain and the United States. The experience so far suggests that deregulation of railways is associated with improved rail safety. This association does, however, not necessarily imply a causal relationship.

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*Keywords:* Deregulation; Transport safety; Evaluation; Meta-analysis

## 1. Introduction

During the last 25 years commercial transport has been deregulated in many countries. The wave of deregulation started by airline deregulation in the United States of America in 1978 (effective from January 1, 1979). Countries that have deregulated commercial transport include the United States, New Zealand, Great Britain and several other European countries.

The objective of this paper is to summarise current knowledge regarding the effects on transport safety of deregulating transport. The main question the paper seeks to answer is: to what extent does deregulation of commercial transport affect transport safety? In order to answer this question, a literature survey has been conducted and the findings of studies that have evaluated the effects on safety of deregulation have been synthesised by means of meta-analysis.

## 2. The concept of economic deregulation

Economic deregulation of an industry can be defined as the removal of formal regulations limiting entry to the industry, by giving anyone who wants to start a business the freedom to do so at his or her own risk (Moses and Savage, 1989). In a regulated industry, new firms can enter only by applying a public regulatory agency for permission to do so. Regulated industries are often also characterised by price controls, by means of which prices are determined by public regulation. The main purpose of deregulating an industry is to enforce competition. A deregulated business normally continues to be subject to a number of regulations, including the following:

1. anti-trust laws, prohibiting price collusion or mergers that threaten to monopolise the industry;
2. safety standards for vehicles (aircraft, rolling stock, cars) and their maintenance;
3. safety regulations for traffic operations (air traffic control, minimum spacing between aircraft, signal control of trains, speed limits for road transport, etc.);
4. regulations of working conditions for employees (maximum length of working hours, minimum rest periods, regulations

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specifying professional qualifications needed to get a job, etc.).

In general, safety regulations of an industry remain in force when it is deregulated.

### 3. Literature survey and meta-analysis

#### 3.1. Literature survey and study inclusion criteria

In order to identify studies that have evaluated the effects on transport safety of economic deregulation, a computer search was made of the TRANSPORT literature database, employing “deregulation and safety” as search terms. A total of 464 studies were identified. Studies that were judged to be relevant were retrieved. A study was regarded as relevant if, based on its title, it was likely to be an evaluation study, that is a study that has tried to determine the effects of deregulation on transport safety. There were no restrictions on study age or study language. Studies classified as not relevant included studies that: (1) were clearly not scientific, not having been published in a scientific journal or by a research institute; (2) clearly seemed to deal with a different topic. The large majority of the 464 studies found did not deal with the effects on transport safety of economic deregulation.

Evaluation studies were included in the meta-analysis if: (1) the study contained one or more numerical estimates of the effects of deregulation on transport safety, or such estimates could be extracted based on information given in the study. (2) The precision (sampling variance) of each estimate of effect is

stated or can be estimated. A total of 25 studies, including two that were re-analyses of earlier studies or based on data provided by other studies (Elvik, 2003a,b) were included in the meta-analysis. Table 1 lists these studies chronologically.

In addition to the studies included in the meta-analysis, a further 16 studies were retrieved that could not be included in the meta-analysis, chiefly because they did not provide sufficient data about the precision of the estimate of effect. These studies are listed in Table 2, which also states the reason for not including them in the meta-analysis.

This paper does not include a traditional review of the studies, discussing in detail the findings of each study. Studies were assessed with respect to the possibility of including them in a meta-analysis only. However, for each study a number of characteristics were coded in order to test for their effects as part of the meta-analysis. These characteristics included (among others) country of origin, year of publication and confounding variables controlled for in the study. The 25 studies that were included in the meta-analysis provided a total of 78 estimates of effect. Thirty-two estimates of effect refer to road transport, 28 refer to aviation and 18 to rail transport. No studies were found that have evaluated the effects of deregulating maritime transport.

#### 3.2. Extraction of estimates of effect

Most of the studies that have been included in the meta-analysis provide one or more estimates of the effects on transport safety of deregulation. In some studies, however, an estimate of effect is not provided, but data that can be used to generate such an estimate are provided. This includes the studies of Jovanis

Table 1  
Evaluation studies included in meta-analysis (chronologically)

Study id	Authors (year)	Country	Effect mechanism	Transport mode	Type of transport	Number of estimates	Statistical weight
1	Frith and Derby (1986)	New Zealand	Deregulation	Road	Goods	6	362.3
2	Daicoff (1988)	United States	Deregulation	Road	Goods	3	235.5
3	Jovanis (1988)	United States	Deregulation	Road	Goods	1	54.6
4	Barnett and Higgins (1988)	United States	Deregulation	Aviation	Passenger	1	2.3
5	Boyer (1989)	United States	Mode shift	Rail to road	Goods	2	23.2
6	Button (1989)	United States	Deregulation	Aviation	Passenger	2	0.6
7	Corsi and Fanara (1989)	United States	New entrants	Road	Goods	1	42.6
8	Kanafani and Keeler (1989)	United States	New entrants	Aviation	Passenger	1	18.3
9	Jordan (1989)	United States	Deregulation	Aviation	Passenger	2	12.3
10	Rose (1989)	United States	Deregulation	Aviation	Passenger	4	21.3
11	Kanafani and Keeler (1990)	United States	Deregulation	Aviation	Passenger	1	4.1
12	Astrop et al. (1991)	Great Britain	Deregulation	Road	Passenger	2	69.4
13	Bylow and Savage (1991)	United States	Mode shift	Road to air	Passenger	1	90.7
14	Phillips and McCutchen (1991)	United States	Deregulation	Road	Goods	2	50.2
15	Oster and Strong (1992)	United States	Deregulation	Aviation	Passenger	3	14.1
16	White et al. (1992)	Great Britain	Deregulation	Road	Passenger	2	129.6
17	Foreman (1993)	United States	Deregulation	Aviation	Passenger	9	42.6
18	Evans (1994)	Great Britain	Deregulation	Road	Passenger	3	192.3
19	Frith and Guria (1995)	New Zealand	Deregulation	Road	Goods	2	217.4
20	Elvik (1997)	Norway	Deregulation	Road	Goods	4	521.1
21	Savage (1999)	United States	Deregulation	Aviation	Passenger	1	6.2
22	Elvik (2003a)	United States	Deregulation	Road	Goods	3	235.5
23	Elvik (2003b)	United States	Deregulation	Aviation	Passenger	4	14.7
24	Savage (2003)	United States	Deregulation	Rail	Passenger	7	170.5
25	Evans (2004)	Great Britain	Deregulation	Rail	Passenger	11	274.7

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