

Can Consumer Rights Improve Service Quality?

Evidence from EU Air Passenger Rights

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Consumer Protection

- There are two ways to protect consumers:
 1. **Regulation:** traditional approach → tells firms what to do.
 2. **Consumer rights:** a new form of regulation → strengthens the position of consumers to seek redress from firms.
- Each has its pros and cons:
 - Private Enforcement vs Government Supervision
 - Insurance dimension: compensation vs fines
 - Adjustment speed: courts vs legislative process
- We know a lot about regulation but little is known about consumer rights



This paper:

- First econometric study of consumer rights
- Exploits the landmark EU consumers protection policy: EU air passenger rights.
 - Identification through a legal quirk: non uniform coverage
- Preview of results:
 1. Regulated flights are five p.p. more likely to arrive on time
 2. Mean arrival delay is reduced by almost four minutes.
 3. The effect is strongest on routes with little competition, and for legacy carriers.
 - ▶ Consumer rights can improve quality when incentives from competition are weak.



Outline

1. Airline Delay and Airline Passenger Rights Regulation
2. Economics: The Airline Delay Literature
3. Econometrics: Do Passenger Rights Reduce Delay?
4. Results
5. Discussion: Mechanisms



Section 2

Policy



Airline Delay: Serious Welfare Costs

- Flight delay is a widespread problem
- Average EU flight has 11.3 minutes delay (Eurocontrol 2016), 12.15 minutes in the US (DOT 2015)
 - 75% of delay minutes are caused by airline operations or late arriving aircraft
 - 25% due to systemic causes (weather, airspace congestion)
- Serious welfare consequences: \$32.9 bn annual cost in total for the US alone (Ball et al., 2010)
 - 25% borne by airlines
 - 50% borne by passengers, e.g. lost time, incremental expenses
 - 25% externalities, e.g. lost business productivity



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- **Policy Question: Should airlines pay for delay?**
 - US: Airlines cause three-quarters of delay, bear one-quarter of the cost
 - EU: “Passenger Rights Regulation” – shifts the imbalance through a passenger compensation scheme



EU Air Passenger Rights

- EU Regulation 261/2004 (EC261) establishes **Air Passenger Rights**
- Defines four Liability Events
 - Denied Boarding
 - Involuntary Upgrading/Downgrading
 - Cancellation
 - Delay
- Defines three Remedies
 - Right to reimbursement or re-routing
 - Right to care
 - Compensation for lost time



EU Passenger Rights: Compensation

- Right to care (meals, hotel) must be always granted, irrespective of cause (e.g. Eyjafjallajökull)
- Unless the delay was caused by “extraordinary circumstances”, the airline must offer cash compensation for lost time at the **final** destination :

Category	Distance (km)	Min. Delay	Compensation
1	≤ 1500	3h	EUR 250
2	1500 – 3500	3h	EUR 400
3	> 3500	3h-4h	EUR 300
		$\geq 4h$	EUR 600

Note: Values for flights outside the EU; for intraEU flights values marginally different.

- Irrespective of ticket price



EU Passenger Rights: Eligibility

- ✓ If your flight is **within the EU** and is operated either by an **EU or a non-EU airline**
- ✓ If your flight **arrives in the EU** from outside the EU and is operated **by an EU airline**
- ✓ If your flight **departs from the EU** to a non-EU country operated **by an EU or a non-EU airline**

EU means the 28 EU countries , including Guadeloupe, French Guiana, Martinique, Réunion Island, Mayotte, Saint-Martin (French Antilles), the Azores, Madeira and the Canary Islands as well as Iceland, Norway and Switzerland

YES, CHECK YOUR RIGHTS



- ✗ If you take a flight which **arrives in the EU** from outside the EU and is operated by an **non-EU airline**
- ✗ If you have **already received benefits** (compensation, re-routing, assistance) for flight related problems under the relevant law of a **non-EU country**

EU excludes the Faeroe Islands, the Isle of Man and the Channel Islands

NO, YOU DON'T HAVE ANY RIGHTS



Source: European Commission, "Your Europe" web site



EU Passenger Rights: Eligibility

Figure: EU flight obstruction compensation eligibility scheme

	EU-bound	non-EU-bound
EU Carrier	YES	YES
non-EU Carrier	NO	YES



EU Passenger Rights: Enforcement

- Regulation came into force in 2004, but airlines initially reluctant to comply and low consumer awareness
- Delay compensation was introduced through the European Court of Justice in 2009 (Sturgeon Case, Garben (2013))
 - Eligibility redefined in subsequent ruling
 - Currently 180 ongoing cases at ECJ
 - However, regulation enforced locally (possible heterogeneity across jurisdictions)
- Initially claim rates were low: <5% of eligible passengers claimed compensation according to surveys (European Commission 2013)
- Compliance and claim rates have since increased, partly due to the growth of claims agencies, but no hard data available so far
- Air passenger rights in EU much broader than anywhere else in the world.



Section 3

Economics



Airline Delay: Role of Consumers

- Forbes (2008): Flights with less average delay command higher ticket prices
- Ater and Orlov (2015): Spread of Internet in the US correlates with growth of low-cost carriers, higher scheduled flight duration, and more delays
 - US domestic flights from 1997–2007 combined with Internet use surveys near airports
 - 10% increase in Internet penetration causes 1 min more delay
 - Lower search costs: consumers choose cheaper but lower quality flights
 - Historically: after US airline deregulation, price and quality fell



Airline Delay: Supply Side

- Operational
 - Mayer and Sinai (2003a): Airlines have more delay on average when departing from a hub airport (2.34–7.25 minutes).
 - Daniel (1995): congestion externalities
 - Mayer and Sinai (2003b): Airlines have incentives to set optimistic flight duration, because crew costs depend on maximum of actual and scheduled time
- Market Structure
 - Mazzeo (2003): More competition is correlated with better on-time performance (sample period: early 2000s)
 - Prince and Simon (2015): low-cost entry increases delay



Airline Delay: State of the Art

- Business strategy for delay mitigation
 - Nicolae et al. (2016): checked baggage fees reduce delays, improve on-time performance
 - Forbes et al. (2015): Even small bonuses for airline staff can improve on-time performance (gamification?)
 - At the margin, airlines can reduce delay at relatively low cost (bonus programs, checked baggage, etc.)
- Open Questions
 - Can passenger rights regulation motivate delay reductions?
 - If so, how large is the delay impact?
 - Is passenger rights regulation likely to be welfare improving?



Section 4

Econometrics

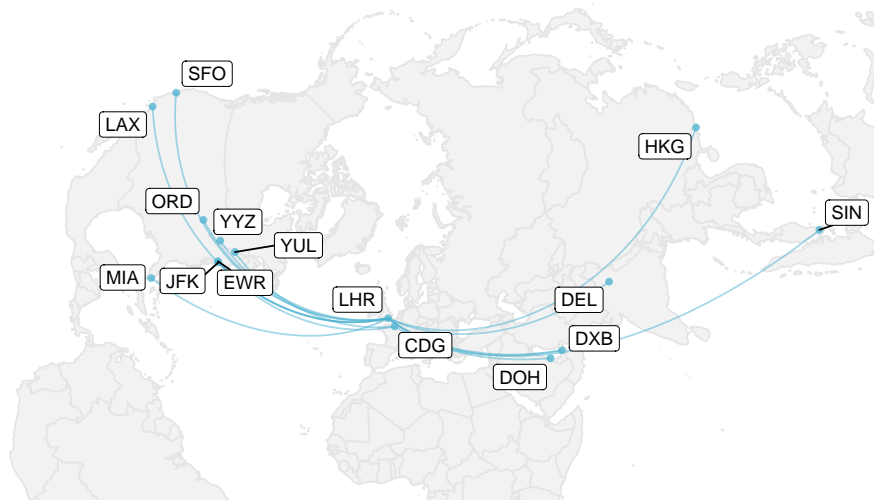


Data Set

- Eurostat: Top 15 EU/Non-EU routes by passenger volume in 2015, subject to distance exceeding 3500km (category 3 flights)
- FlightAware: Flights on these routes from Nov 2016 to July 2017. Close to a population sample. For each flight, scheduled vs. actual gate / runway departure and arrival times. Measured at minute resolution. Source: Airlines and ADS-B. Total: 49091 flights. Dataset new to economics.
- US Department of Transport: Domestic flights between the US airports in the sample for the same period. Same variables observed. Source: Airlines. Total: 89890 flights



Data Set: Route Map





Identification Strategy: Illustration





Identification Strategy: Illustration



———— 20:40 BA172 —————>

———— 20:30 DL402 —————>

<———— 11:20 BA173 —————

<———— 11:30 DL403 —————





The Hub Effect

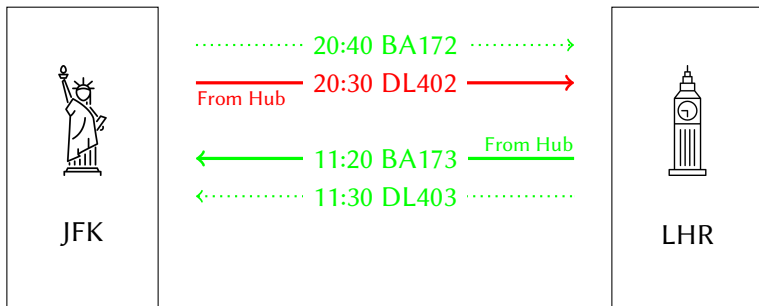
- Legacy Air Carriers: Operate long-haul flights from hub in their countries of origin
- Example: BA has a hub in Heathrow, DL has a hub in JFK

True Model

$$y_{ft} = \beta \text{EU Carrier}_f \times \text{EU-Bound}_f + \gamma \text{From Hub}_f + \text{Airline}_f + \text{Route}_{ft} + \epsilon_{ft}$$



Identification Strategy: Illustration





The Hub Effect

- Example

$$BA_{172,t} = \beta * 1 + BA + JFK-LHR_t + \epsilon_{f,t}$$

$$DL_{402,t} = \beta * 0 + \gamma \text{From Hub} + DL + JFK-LHR_t + \epsilon_{f,t}$$

$$BA_{173,t} = \beta * 0 + \gamma \text{From Hub} + BA + LHR-JFK_t + \epsilon_{f,t}$$

$$DL_{403,t} = \beta * 0 + DL + LHR-JFK_t + \epsilon_{f,t}$$



The Hub Effect

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$$DL_{403,t} = \beta * 0 + DL + LHR-JFK_t + \epsilon_{f,t}$$

- Potential Bias in Diff-in-Diff estimator:

$$\begin{aligned} DiD &= (BA_{172} - DL_{402}) - (BA_{173} - DL_{403}) \\ &= \beta - 2 * \gamma \text{From Hub}_f \end{aligned}$$

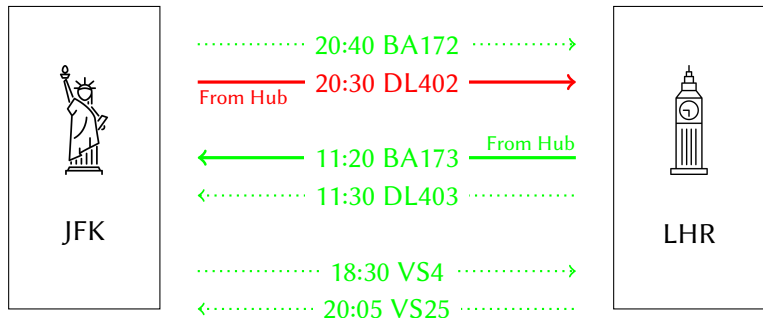


The Hub Effect

- Problem: Treatment is highly multicollinear with other FEs: Impossible to jointly estimate hub, airline and route FEs in the example shown.
- Solutions:
 1. New Generation Carriers (Virgin, Norwegian) do not use a hub model, so they identify the model.
 2. Add more destinations to tie down the hub effect, e.g. intra-US

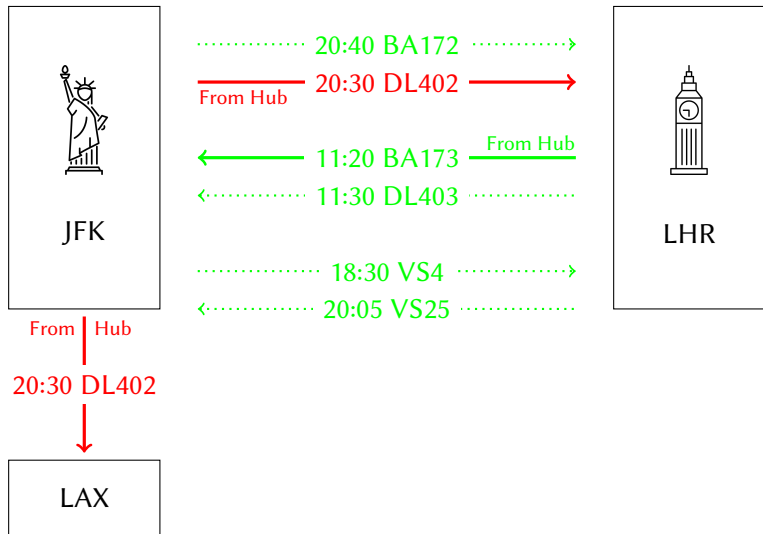


Identification Strategy: Illustration





Identification Strategy: Illustration





Identification Strategy

Baseline Specification

$$y_{ft} = \beta \text{EU Carrier}_f \times \text{EU-Bound}_f + \text{Route}_{ft} + \text{Airline}_f + \gamma \text{From Hub}_f + \epsilon_{ft}$$

Route-Time Effect

- A particular luxury of our setting
- Captures systemic delay causes (ATC, weather, etc.)
- Other airline delay studies typically explore market or policy changes collinear with route-time.



Section 5

Results

**Table:** Delay Impact of EC261

Dependent Variable	Departure Delay (minutes)	Arrival Delay (minutes)	Arrival On time	Arrival Delay >180 min
Model	(1)	(2)	(3)	(4)
Coefficient Estimates				
EU Carrier _f × EU-Bound _f	-4.92 (1.11)	-3.90 (1.20)	0.054 (0.014)	-0.004 (0.003)
From Hub _f	3.60 (0.53)	3.31 (0.58)	-0.046 (0.006)	-0.002 (0.002)
Observations	137157	137157	137157	137157
R ²	0.25	0.31	0.28	0.31

Notes: All regressions include airline and route-day fixed effects. Standard errors are clustered at the route-day level.

Source: Authors.



EC261 effect: Panel Estimates

- EC261 Effect: The regulation causes a reduction in mean delay of 4-5 minutes and increases the probability of on-time arrival by 5 percentage points.
 - Statistically and economically significant!
- Hub Effect: More departure and arrival delay (3.5 minutes)
 - Magnitude in line with Mayer and Sinai (2003a): airlines wait for connecting passengers
 - Suggests that identification works
 - R-squared 25-30%: in line with share of minutes attributed to systemic causes



Section 6

Discussion



Understanding EC261

- EC261 does seem to reduce airline delays
 - Identification through variations in coverage
 - Robust to possible measurement error and changes in specification as shown later
- What drives the EC261 effect?
 - Route Competition
 - Legacy Carriers vs. New Generation Carriers
 - National Enforcement



Route Competition

- Competition may reduce airline delay: Substitute for regulation?
- How do regulation and competition interact?
- Route Competition
 - Measure: Herfindahl-Hirschman index (higher value \rightarrow less competition)
 - London - Los Angeles and New York are most competitive (HHI $<$ 0.3)
 - Asian Routes least competitive (Dubai, Doha, Hong Kong)



Airline Type

- Legacy Carriers (e.g. British Airways)
 - Former national “flag carriers”
 - Emphasis on Hub model
 - Assets in place and business model predate EU261
- Point-to-Point Carriers (e.g. Norwegian, Virgin Atlantic)
 - formed after air liberalization
 - emphasis on point-to-point model
 - simplified fleet structure
- Legacy carriers may be more exposed to EU261: larger average delay, connecting flights



National Enforcement

- EC261 is a *regulation* which applies uniformly in all member states (as opposed to a *directive*)
- However, details not specified in the regulation are determined by each member state through national legislation
- Limitation Period: from 1 year (Belgium) through 5 (France) to 6 (UK)
- Sanctioning Airline Non-Compliance
- Complaints Procedure for Passengers, e.g. small claims court in France is without fees, while in UK the minimum fee is EUR 63 (European Commission 2010)

**Table:** Heterogeneity of Delay Impact of EC261

Dependent Variable Model	Departure Delay				
	(1)	(2)	(3)	(4)	(5)
Coefficients					
EU Carrier _f × EU-Bound _f	-5.56 (1.35)	-0.34 (2.09)	-3.79 (1.24)	-4.58 (2.00)	-2.20 (1.29)
× P2P Carrier _f	1.46 (1.05)				
× Route HHI _f		-11.51 (4.45)			
× (Route HHI > Median HHI) _f			-2.31 (1.08)		
× (UK Market) _f				-0.37 (1.81)	
× (North Am. Market) _f					-4.12 (1.15)
From Hub _f	3.40 (0.60)	3.54 (0.53)	3.57 (0.53)	3.61 (0.53)	3.65 (0.53)
Num. obs.	137157	137157	137157	137157	137157
R ² (full model)	0.23	0.23	0.23	0.23	0.23

Source: Authors. All regressions include airline and route-day fixed effects. Standard errors are clustered at the route-day level.



EC261 effect: Heterogeneity

- Airline Type: Impact weaker on P2P carriers. Not surprising: delay at a hub may imply missed connection.
- Competition: Impact strongest on routes with weaker competition:
 - Given the distribution of HHI in the sample, the effect ranges from 2.5 minutes of delay reduction on the most competitive routes to 8 minutes on the least competitive routes.
 - Similar results for $HHI > \text{median}$ indicator
 - Caveat: Only 15 markets in our sample
- Enforcement: No difference between UK and France, but small sample
- Market: Middle East and Asian carriers have more modern fleets, hence EU carriers need to try hard: impact of regulation smaller on those markets.



Robustness

- Source of variation
 - Check if estimates differ between subsamples (Flight Aware vs DoT)
- Airline-Hub FEs
 - Specificities of the hub model may differ between the carriers
- Route-Time Matching
 - Within-day variation in systemic causes of delay (weather, congestion).
 - Match flights on the same route with different EU status within four hours using optimal matching.
 - Cost: We lose unmatched observations.

**Table:** Delay Impact of EC261: Impact of Sample Coverage

Dependent Variable	Departure Delay			Arrival Delay		
	(1)	(2)	(3)	(4)	(5)	(6)
Coefficient Estimates						
EU-bound _{<i>f</i>} × EU Carrier _{<i>f</i>}	-3.19 (1.53)	-6.74 (1.57)	-3.63 (1.83)	-3.97 (1.72)	-6.45 (1.68)	-7.63 (2.02)
From Hub _{<i>f</i>}	4.57 (0.83)	3.37 (0.62)	5.10 (1.02)	3.27 (0.93)	3.31 (0.66)	2.95 (1.12)
Sample Coverage						
<i>Routes</i>						
EU-US	✓	✓	✓	✓	✓	✓
Other Extra-EU	✓			✓		
US Domestic		✓			✓	
<i>Carriers</i>						
Legacy Carriers	✓	✓	✓	✓	✓	✓
Point-to-Point	✓		✓	✓		✓
Num. obs.	48426	111040	26171	48426	111040	26171
R ² (full model)	0.25	0.22	0.23	0.38	0.30	0.36

Source: Authors. All regressions include airline and route-day fixed effects. Standard errors are clustered at the route-day level.

**Table:** Further Robustness Tests

	Airline-Hub FEs		Route-Time Matching	
	Dep. Delay (1)	Arr. Delay (2)	Dep. Delay (3)	Arr. Delay (4)
EU-bound _f × EU Carrier _f	-5.50 (1.17)	-5.99 (1.27)	-5.04 (2.58)	-5.65 (2.76)
From Hub _f			4.68 (1.44)	3.20 (1.54)
Num. obs.	137157	137157	26754	26754
R ² (full model)	0.23	0.31	0.51	0.61

Source: In models (1) and (2), we allow the hub effect to vary by airline, essentially creating an airline-hub fixed effect. In models (3) and (4), we replace the route-day fixed effect with a route-time four hour window. All regressions include airline fixed effects and standard errors clustered by route-time.



EC261 Effect: Robustness

- EC261 Effect: Consistently significant across specification
- Variation in treatment effect.
 - Consistent with earlier findings: Impact strongest in the sample with the legacy carriers only



Claim agencies: a source of success of EC261

- EC261 has created a market for claim assistance:
 - Relatively high compensations paid in cash.
 - Large volumes: 5 million eligible consumers a year.
- Specialised claim agencies reduce the transaction costs to close to zero
 - Complaint with two clicks and a signed document.
 - Contingent fee of 25%
- Challenging start:
 - Administrative data on delays and delay causes not available to the public.
 - Strong opposition of the airline industry.
- Currently, a credible threat to sue if airlines don't comply (with very high success rate)

Claim compensation for your flight delay or cancellation

Flight delays happen, but that doesn't mean you have to accept them. You may be entitled to as much as \$700 in compensation if your flight has been delayed, canceled or overbooked within the last three years.



Departed from



Final destination

Check Compensation



Up to \$700 in compensation



Risk free - no hassle, no stress



Over 7 million happy customers





Conclusion

- EC261: Pioneering Passenger Rights Regulation
- Example of a broader trend towards Consumer Rights
- Significantly Reduces Airline Delay
 - Exploiting variation in coverage on EU-bound leg
 - Estimate reduction in gate arrival & departure around 5min
 - Economically meaningful, statistically significant effect
 - Impact strongest on routes with little competition
- Markets facilitate enforcement, significantly decreasing transaction costs, but more research needed.



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Welfare: Is EC261 a good idea?

- Stated EU objectives: “ensuring a high level of protection”, avoid “trouble and inconvenience” for passengers
- Essentially a tax on low quality. Low income consumers may prefer low quality and low price.
- To argue that EC261 increases welfare, we could appeal to
 1. Externalities. Delay impact studies count lost business/productivity as an externality, does not reflect economic reality of business travel
 2. Bounded rationality of consumers: poorly informed. Not plausible with frequent flyers
 3. Bounded rationality of airlines: maybe delay mitigation is really cheap at the margin and they need a nudge