TRANSPORTATION

The Boeing Dilemma

By pushing the jet maker to increase safety, regulators risk putting more travelers on less safe roads.

BY PETER VAN DOREN AND DENNIS L. WEISMAN

Boeing has been in the news a lot lately, for all the wrong reasons. The iconic aviation company has been struggling through a series of high-profile quality-control problems, including a door coming off an Alaska Airlines jet while in flight (fortunately, with only minor injuries), cracked windshields, wheels falling off landing gear, engine fires, and possible flaws in the design of the pilot's seat. These come only a few years removed from the ill-fated launch of Boeing's next-generation 737 Max8 aircraft, which suffered two fatal crashes over a five-month period and resulted in the plane being grounded for almost two years. It's worth noting that rival Airbus has experienced some of the same issues (Chung 2024), but Boeing is under a very dark cloud.

The firm's problems, even if they are found not to be systemic, have only contributed to the public's already heightened anxiety over flying, stoked by several highly publicized near misses at the nation's airports in recent years and a severe shortage of qualified traffic controllers. Worry is especially high for Boeing aircraft: databases report a record number of travelers are changing their itineraries to avoid the planes. Some flyers reportedly are turning to anti-anxiety drugs and prayer to calm their fears, while others are refusing to fly altogether (Sorace, 2024).

Boeing announced in March that its CEO, David Calhoun, will be leaving the company. This comes on the heels of other high-level management changes. The company's stock price is down dramatically, recently hitting a five-month low, and the CEOs of several major airlines have requested to meet directly with Boeing's board. Airbus now commands nearly a 62 percent market share for narrow-body jets (Wiltermuth, 2024). There is little prospect of Boeing making significant inroads against Airbus in the short run as airlines value a homogenous jet fleet because it economizes on training. In the aftermath of the Alaska Airlines incident, the U.S. Justice Department initiated a criminal probe of Boeing and Federal Aviation Administration (FAA) audits at the company's factories have turned up scores of problems with the 737 aircraft.

A serious concern is that these quality-control problems will lead more travelers to abandon the skies for the nation's highways. Driving is far more dangerous than flying, and a shift from air to roadway travel means more fatalities and injuries. This creates a bitter dilemma for regulators: If the public does not believe the agency is "cracking down" appropriately on Boeing, more of them will substitute auto travel for air travel. *But* if the FAA cracks down heavily on Boeing, new quality control efforts will raise the jet maker's costs and its planes' prices, which will translate to higher airfares and, in turn, more travelers substituting auto travel for air travel. The public policy question is what course of action would minimize the risk of public harm?

THE FATEFUL SUBSTITUTION OF AUTOMOBILE TRAVEL FOR AIR TRAVEL

Increasing the price of air travel or decreasing its safety (real or perceived) would be expected to decrease demand for air travel and increase demand for automobile travel. This substitution is problematic because automobile travel is 100 times more dangerous than air travel in terms of fatalities per mile traveled. (See "The Risk of Too Much Air Safety Regulation," Spring 2020.) This type of cost–benefit calculus previously led regulators to decide against mandating child safety seats on commercial aircraft because the mandate could double the price to fly for a family of four (Sanders, Weisman, and Li 2008). As we wrote elsewhere: "The risk of injury in driving is almost 24,000 times greater than that of flying on a per-mile basis. The roads are dangerous and deadly—the skies are markedly less so" (Van Doren and Weisman 2020). It is likely that Boeing's recent quality-control problems and the Alaska Airlines incident,

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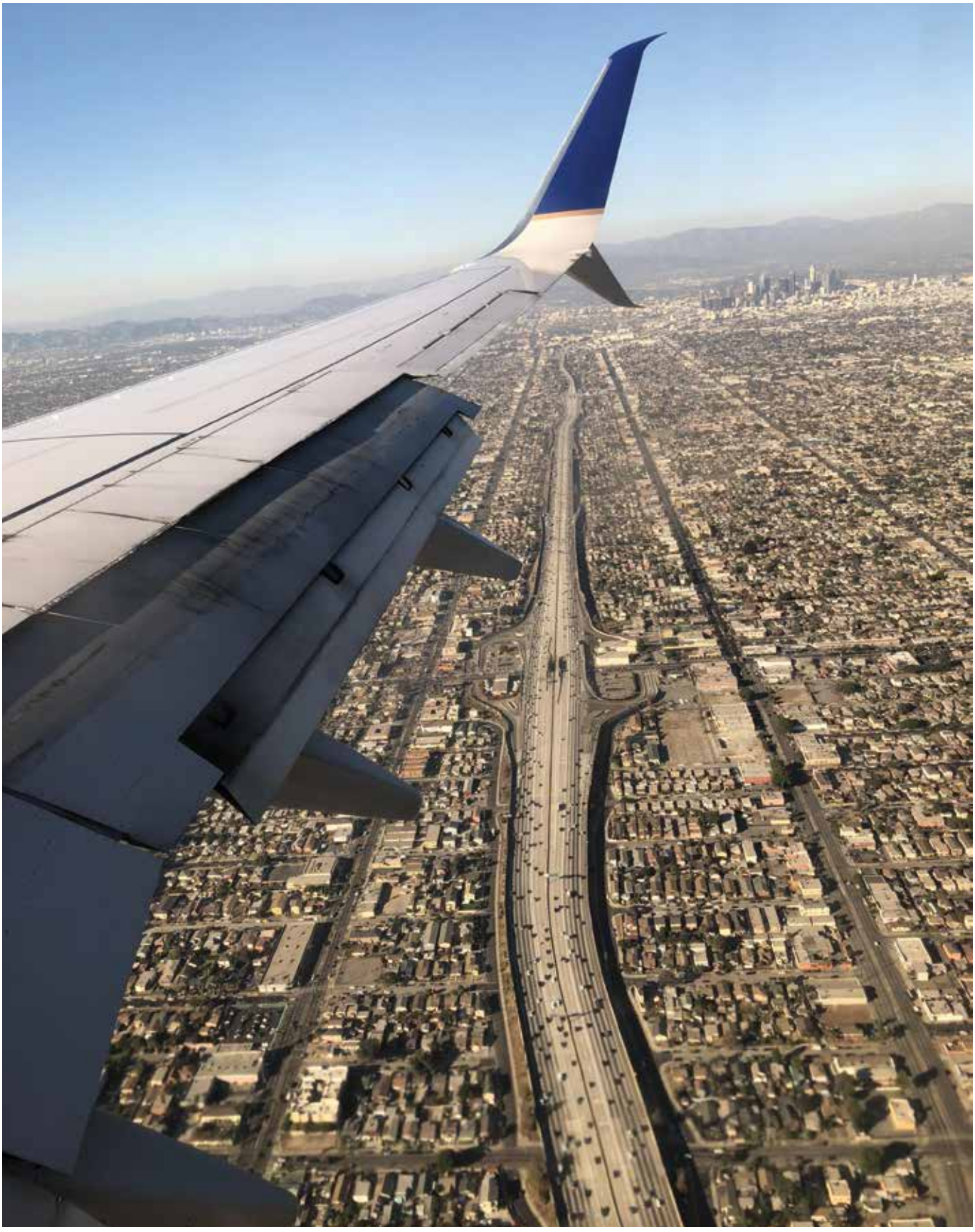

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in particular—which to date have resulted in zero fatalities in the air—have nonetheless resulted in an increased number of fatalities and injuries on the ground as automobile travel displaces air travel.

To better understand the policy tradeoffs, suppose that the safety-adjusted price of airfare can be represented by $\hat{p} = \frac{p}{s}$ where p is the nominal price of airfare and s is a measure of perceived airline safety. If s decreases and p is unchanged, then $\hat{p}$ increases, causing a substitution of automobile travel for air travel. If the FAA intervenes and improves Boeing's quality control, both s and p increase. That can reduce $\hat{p}$, inducing more travelers to fly, but only if the percentage increase in s exceeds the percentage increase in p. This would be the case if the elasticity of p with respect to s (or $\% \Delta p \div \% \Delta s$) is less than 1. If not, more travelers will drive and the increase in fatalities and injuries on the roads will exceed the decrease in fatalities and injuries in the air, which is precisely the opposite of what we should want from a public safety perspective.

The perception that flying is less safe is a contagion that is likely to spread, encouraging more automobile travel and resulting in more fatalities and injuries on the ground.

THE MARKET FAILURE

The policy default in a market economy is to rely on competition to control prices and quality. A market failure occurs when market forces cannot be relied upon to provide for an efficient allocation of society's resources. Prices may be too high or quality may be too low as a result of market distortion.

In this case, the source of the market failure is that neither the commercial airlines nor the aircraft manufacturers consider the positive benefits that flying's safety record (or perceptions of flying's safety record) has on reducing automobile travel. As a result, the profit-maximizing level of safety may differ from the efficient level of safety.

This safety externality allows for the possibility of an efficiency improvement if government action could reduce automobile travel or increase air travel. (To simplify our argument, we are ignoring the possibility that other factors may have led to an inefficiently low level of automobile travel.) To be more specific, a hypothetical Pigouvian tax on automobile travel or a subsidy to air travel and/or some regulatory equivalent could reduce fatalities and injuries among the traveling public. Regulation is sometimes justified on the basis of a market failure, but only if the benefits of the intervention exceed the costs, properly defined.

IF BOEING'S PROBLEMS ARE SELF-CORRECTING

Suppose that regulators decide not to intervene to improve Boeing's quality-control problems. This decision may be based on the belief that Boeing's problems are self-correcting: that competition from rival Airbus will provide the incentive for Boeing to get its house in order.

What are the likely short-run effects of this policy choice? There are at least three.

First, a proper subset of Boeing planes may be grounded, with adverse effects on the schedules of the commercial airlines, particularly United and Southwest. The reduced number of flights would put upward pressure on airfares. The increase in airfare operates through the cross-price effect to increase automobile travel, which leads to additional fatalities and injuries on the ground.

Second, commercial airlines would turn increasingly to Airbus for their aircraft needs. This confers additional market power on Airbus that is reflected in higher prices for their planes. This price premium is passed through to consumers in the form of higher airfares, causing more automobile travel through the cross-price effect and an increase in fatalities and injuries on the ground.

Third, the perception (if not the reality) that flying is less safe is a *contagion* that is likely to spread, not unlike a run on the banks. This would encourage more automobile travel because increases $\hat{p}$ as s decreases and results in still more fatalities and injuries on the ground.

The fact that each of these effects contributes to increased fatalities and injuries is not dispositive of the need for regulatory intervention. It is possible that regulatory intervention would cause even more fatalities and injuries on the ground, particularly if regulatory compliance costs drive up the nominal price of airfare. Hence, the composite effect on $\hat{p}$ is uncertain a priori.

IF BOEING'S PROBLEMS AREN'T SELF-CORRECTING

The National Transportation Safety Board (NTSB) is reportedly growing impatient with Boeing because the agency cannot obtain the maintenance records it has requested about the Alaska Airlines incident and the role that "out-of-sequence" work—tasks performed in an order different from what was planned—may have played in the near catastrophe (Jenkins 2024). In addition, a recent *Wall Street Journal* article claims that Boeing's problems cannot be resolved in the short run but may

take two decades to rectify (Terlep, Cutter, and Tangle 2024).

If the government can intervene with effective quality-control protocols that do not precipitate a material increase in airfares, there may be a case for such intervention. If not, intervention may only exacerbate the problem by increasing fatalities and injuries on the nation's highways without significantly reducing fatalities and injuries in the air.

In the latter case, government protocols may improve quality control but also increase airfares. The benefit is that travel is diverted from the highways to the skies through an increase in perceived air safety s that lowers the safety-adjusted price of airfare $\hat{p}$, which would be expected to reduce injuries and fatalities, ceteris paribus. The cost is that travel is diverted from the skies to the highways because regulatory compliance costs increase the nominal price of air travel p and therefore $\hat{p}$, which would be expected to increase injuries and fatalities, ceteris paribus. We do not know a priori which effect dominates, so the net effect on $\hat{p}$ is uncertain.

We do not believe it is likely that any new quality-control protocols will require expensive new systems similar in scope and scale to those contemplated in the aftermath of the Max8 crashes. Not all serious problems require expensive remedies. What has yet to be determined is whether Boeing's problems stem from management, systems, engineering, culture, or a combination of those factors. A recent article blames Boeing's current problems on a bad merger with McDonnell–Douglas in 1997, prioritizing accounting over engineering initiatives (Wing-Uexkul 2024).

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TOO BIG TO FAIL?

Another consideration in evaluating the merits of regulatory intervention is whether Boeing is "too big to fail." Is the government prepared to let Boeing become just another casualty of Schumpeter's "perennial gale of creative destruction"? Another fatal crash may well put the company in a tailspin from which it cannot recover, leaving Airbus as the sole supplier of large commercial aircraft. It is possible, perhaps even likely, that the government would find this unacceptable given the far-reaching implications for national security, the US economy, and the supply of parts.

Boeing is a 108-year-old company with a proud history of aviation success and technological prowess, but in recent years it seems to have lost its way. Harvard business historian Thomas McCraw (2007) explains that this is not uncommon for companies that once dominated their industries:

> Almost all businesses, no matter how strong they seem to be at a given moment, ultimately fail—and almost always because they failed to innovate. Competitors are relentlessly striving to overtake the leader, no matter how big the lead. Responsible businesspeople know that they ignore this lesson at their peril.
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> ...No country, regardless of how long it has been prosperous, can take permanent affluence for granted. Nor can any company assume its continued existence—as names such as Digital Equipment, Pan American Airways, Pullman, Douglas Aircraft, and the Pennsylvania Railroad remind us. Each of these companies once epitomized the cutting edge not only of its own industry but of American business as a whole. And all are now in the dustbin of history, along with hundreds of thousands of other businesses of all sizes—once as strong as dinosaurs but now just as extinct.

The case for regulatory intervention may be more compelling if Boeing is "too big to fail" because more aggressive regulatory intervention today may prevent more serious problems tomorrow, leaving taxpayers with a smaller bill to pay. Then again, there is the all too familiar moral hazard problem. Would Boeing be less likely to resolve its quality-control problems if it believes the government is likely to throw it a lifeline? The savings and loan crisis of the 1980s and '90s is a painful reminder of all that can go wrong.

THINKING OUTSIDE THE BOX

If Boeing is innovation-challenged, it may have to "think outside the box" to resolve its quality-control problem, lest it find itself retrieving a black box from a crash site. To this end, it may want to borrow a page from the United Kingdom's Great Ormond Street Hospital for Children. Naik (2006) reports on a 2005 study that found that nearly 70 percent of preventable hospital mishaps occurred because of communication problems; other studies have shown that at least half of such breakdowns occur during patient handoffs.

Between 1987 and 1993, surgeon Marc de Leval performed 104 "arterial switches" at the hospital. The operation corrects a congenital heart defect and is typically performed within the first two weeks of a newborn's life. During one relatively brief period, seven of his patients died in quick succession.

Heartsick over those tragic outcomes and determined to find a solution, De Leval prevailed upon 21 surgeons across Britain to allow "human-factor" specialists to observe their arterial-switch operations. These specialists employ scientific techniques to study how people interact in a specific environment, including areas where technology is utilized extensively.

The study found unsurprisingly that big mistakes can lead to bad outcomes, but also that small mistakes can tend to go unnoticed and unrectified. A series of small mistakes was found to be highly correlated with bad outcomes. Two of De Leval's colleagues, who were also avid fans of Formula 1 auto racing, subsequently noticed the similarities between patient handoffs in the operating room and the operation of Formula 1 pit crews. This resonated with De Leval. He immediately recognized that pit-stop handovers were successful precisely because of an obsession with avoiding small mistakes. The hospital subsequently reached out to Ferrari's racing team and sought their counsel about how to improve patient handovers. After adopting protocols developed in coordination with Ferrari, the average number of technical errors at the hospital per handover decreased by 42 percent and "information handover omissions" decreased by 49 percent.

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Would similar innovative thinking have decreased the likelihood of incidents like the Alaska Airlines jet, which resulted from Boeing failing to reinstall restraining bolts on a door plug after repairs? Would innovative thinking reduce the number of smaller incidences on Boeing planes that one day could result in a large incident and a mass-casualty event? What we do know is that Boeing's quality-control problems have proven persistent and that there is a growing lack of confidence in the company's ability to solve them.

CONCLUSION

The first principle that should guide any regulator's action is to "do no harm." In the case of Boeing's recurring quality-control problems, there is a risk that the FAA could do significant harm if it fails to objectively evaluate the prospective costs and benefits of any regulatory action or inaction.

The FAA finds itself in a dilemma. If it does too little, public confidence in air safety may continue to erode, causing an increasing number of travelers to drive rather than fly. The result is an increase in injuries and fatalities on the nation's highways (and possibly in the air as well). If it does too much in terms of mandating quality controls, then the price of airfare will rise, perhaps dramatically, pushing more travelers onto the nation's roadways with the significantly higher risks that entails.

Paradoxically, any regulatory missteps with Boeing pose a greater problem for safety on the ground than in the air. It is this collateral harm that the FAA could easily lose sight of, given the mounting political pressures to *do something*. There are costs (measured in terms of fatalities and injuries) associated with *both* action *and* inaction. The policy question is which approach minimizes the cost.

If the FAA can address Boeing's quality-control problem without imposing markedly higher costs on the company, then the case for regulatory intervention is considerably stronger. If it cannot, then we believe the risk is just too great that marginal safety improvements in the air will come at the high price of a considerably larger number of fatalities and injuries on the ground. The problem for Boeing is that it has seemingly "lost the room" and now finds public confidence in its products in a virtual freefall. This is not good news for a company that supplies planes to commercial airlines across the globe. *R*

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