

Do Work Restrictions Improve Product Quality?

Evidence from the Airline Industry*

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Abstract

Legislation H.R. 5900 approved in August 2010 implemented more restrictive pilot rest requirements and increased the number of pilot training hours required (now 1,500 hours) to obtain a pilot license. This paper examines what affect, if any, raising the safety standards have had on flight reliability and airline service quality. A priori, the effect is ambiguous since on one hand, putting in place more restrictive requirements on labor gives a company less flexibility in managing its resources which suggests a detriment to on-time performance. On the other hand, well rested pilots with greater experience may provide enhanced productivity for their employer which may lead to improved on-time performance and more reliable flight schedules. Hence this is an empirical question that can be addressed with airline on-time performance data since H.R. 5900 became effective in August 2013. This event study analysis will show in the short-run a larger impact of labor constraints is felt by the regional carriers who appear to have difficulty in finding pilots who meet the new training hours requirement. In the long run, these effects appear to dissipate.

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1 Introduction

“The National Transportation Safety Board determines that the probable cause of this accident (Continental Connection flight 3407 operated by Colgan Air) was the captain’s inappropriate response to the activation of the stick shaker, which led to an aerodynamic stall from which the airplane did not recover.” (National Transportation Safety Board Accident Report/AAR-10/01, PB2010-91401. February 2, 2010).

The crash of Colgan Air flight 3407 on February 12, 2009 in Buffalo, New York took the lives of all 49 passengers and crew on board in addition to a person whose house was struck by the plane. The ensuing NTSB Accident Report (AAR-10/01) indicated that pilot error was the likely culprit, while pilot fatigue may have also contributed since the cockpit voice recorder indicated a yawn by the co-pilot minutes prior to the crash. As a consequence of this Colgan Air crash, Legislation H.R. 5900 was approved in August 2010 which increased the minimum number of hours for first officers from 250 hours to 1,500 before receiving a pilot certification.¹ The legislation also spurred changes to pilot and crew rest requirements as a new FAA rule issued in December 2011 implements a 10 hour minimum rest period prior to the flight duty period while mandating that a pilot must have an opportunity for eight hours of uninterrupted sleep during the rest period (FAA Fact Sheet - Pilot Fatigue Rule Comparison, 21 December 2011, https://www.faa.gov/news/fact_sheets/news_story.cfm?newsKey=12445). This change constitutes a one hour increase in rest compared to the previous pilot rest rule while the uninterrupted eight hours of sleep opportunity represents a new initiative. Maximum flight time limits were also set to either eight or nine hours depending on when the pilot is scheduled to begin their initial shift. Finally, the new rule implements maximum flight duty period limits based on the number of flight segments while the previous rest rule did not consider the number of flight segments.

As a consequence of the increase in the minimum number of hours to obtain a pilot license and the more stringent requirements on pilot rest, there is an expectation that pilots will be both more

¹See Kleiner (2000) for more information about occupational licensing and its impact on wage premiums and employment.

qualified and better rested. These changes may boost pilot productivity and as a result improve service quality through fewer delays and cancellations. On the other hand, this legislation increases the hurdle before a first officer can obtain a pilot's license and as a result, a short term pilot shortage is possible. In addition, more strict labor regulations will also reduce the availability of finding replacement pilots and flight crews on short-notice. These factors may contribute to more delays and cancellations. Therefore the net effect of these changes in employee work requirements is an empirical question, which we will examine by using airline on-time performance data before and after the implementation of this FAA policy change.

Fatigue and safety is an issue that extends beyond the airline industry. The airline industry is not unique in imposing restrictions on duty time and mandatory duty breaks since such restrictions are in place for in the trucking industry and in the market for medical interns. Both of which have recently revised their duty hours guidelines in an effort to prevent employee fatigue and improve safety. Consider that in the past year, according to the National Sleep Foundation about 20 percent of adults admit to falling asleep behind the wheel (<https://www.nsc.org/road-safety/safety-topics/fatigued-driving>, last accessed 16 November 2019). The Governors Highway Safety Association indicates that 775 fatalities were due to drowsy drivers in 2018 (<https://www.ghsa.org/issues/drowsy-driving>, last accessed 16 November 2019). Employee fatigue can also create dangers for both the worker and others. For example, long-haul truck drivers participating in a study involving round-the-clock electrophysiologic monitoring reveals that they obtained less sleep than required for alertness on the job with the highest risk of sleeping on the job occurred late night and early morning (Mitler et al., 1997). In response to evidence that the hazards posed by fatigued truck drivers in 2003, Congress passed an hours-of-service rule which shortened the driving window for truckers to 14 consecutive hours and increased the off-duty period from 8 to 10 hours. In 2011, Congress revised the hours of service rules for truck drivers in an attempt to reduce driver fatigue to mandate at least a thirty minute break for drivers working 8 consecutive hours (Federal Register, 76:248, 27 December 2011).

While the perception exists that healthy adults can adapt to sleep loss, the effects of chronic

partial sleep loss appear to be cumulative (Carskadon et al., 1991). In the field of medicine, interns that have just worked shifts of extended duration (24 hours or more) report a significantly higher likelihood of being involved in a motor vehicle accident compared to a shift that as not of extended duration (Bargere et al., 2005). Veasey et al. (2002) suggest improved quality of care is provided by well-rested residents. In July 2003, the Accreditation Council for Graduate Medical Education (ACGME) imposed residency duty-hours requirements to address the growing concern about clinician fatigue and the occurrence of medical errors. Bhavsar et al. (2007) examined 1,003 consecutive University of Michigan hospital admissions for acute coronary syndrome and find an increase in adherence to evidence-based guidelines for acute coronary syndrome care after the decrease in residents' work hours. Mortality rates were unaffected by the change in ACGME requirements which limited maximum continuous hours worked to 24 hours and total weekly hours to 80 while imposing a requirement of at least 10 hours between periods of work. These new rules resulted in approximately 20 percent reduction in hours worked per week. One potential drawback from imposing this new work rule is that the typical residency shift is now shorter which results in a decrease in continuity of patient care and an increase in patient hand-offs. These concerns appear to be unfounded due to a 20 percent reduction in mean length of hospital stay and significantly lower 6-month risk-adjusted mortality rates (Bhavsar et al., 2007).

There have been conflicting opinions about the effectiveness of the new ACGME rule on interns. A survey of surgical residents at Wright State University before and after the ACGME residency hours restrictions were implemented reveals that residents felt their quality of life had improved while not adversely affecting their surgical training (Stamp et al. 2005). More recently, however, a survey of general surgery residents who completed their residency under the new ACGME guidelines suggest that interns feel that the duty hour changes have decreased the coordination of patient care, less continuity with hospitalized patients, and shortened time spent in the operating room (Antiel et al., 2013). Slightly less than half of the interns surveyed (44 percent) believe that the new standards have decreased resident fatigue (Antiel et al., 2013).

2 Data

The paper utilizes from

3 Conclusion

Our conclusion goes here.

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