Topics of dissertations for the admission procedure to the doctoral program at the CTU in Prague Faculty of Transportation Sciences

Commencement of Study: 1. October 2025

Department of Air Transport (K621)

Study programme*: *Air Traffic Control and Management

Supervisor:
doc. Ing. Peter Vittek, Ph.D. (e-mail contact: vittepet@fd.cvut.cz)

Topic:
The Impact of EU Refuel Regulations on Air Transport Connectivity and Economic Gravity Effects in Central Europe

Language:
english

Abstract:
The European Union's ReFuelEU initiative is a part of the broader Fit for 55 package, which mandates the adoption of Sustainable Aviation Fuels (SAF) with hydroprocessed esters and fatty acids (HEFA) is likely to be a dominant contributor to SAF output in the near future. The thesis examines how air transport affects economic growth and vice versa. While air transport contributes to the economy through employment, trade, and investment, economic growth also drives demand for air travel.

Maintaining the connectivity and competitiveness, this research further investigates the implications of these regulations through economic gravity effect. The adoption of HEFA fuel is to reshape the aviation prospect aiming to offer a refined understanding of shifts, balances and imperatives of economic and connectivity considerations with the presence of major hubs like Vienna, Budapest, and Warsaw, which attract a larger share of charter flight traffic in the region.

This research holds significance for policymakers, airlines, and regional planners by shedding light on the intersection of sustainability, connectivity, and economic development. The analysis will be conducted through gravity model to quantify the relationship between the fuel costs, airport accessibility, trade flows and air transport demand in the context of the European union's ReFuelEU aviation initiative.

In addition to applying traditional gravity frameworks, the thesis will explore and test modified or newly derived gravity model formulas tailored to aviation-specific variables. This includes incorporating SAF-related cost factors, regional infrastructure disparities, and regulatory thresholds. Furthermore, advanced econometric techniques—including panel data regression, interaction effects, and possibly spatial econometrics—will be employed to examine causal relationships and dynamic interactions between variables over time.

This model enables the assessment of how SAF adoption influences air connectivity, with HEFA emerging as a key driver of supply in the near future. Additionally, a comparative analysis will benchmark Central European air connectivity against other EU regions adapting to similar fuel regulations.

References:
[1] Watson, M. J., Machado, P. G., Da Silva, A. V., Saltar, Y., Ribeiro, C. O., Nascimento, C. A. O., & Dowling, A. W. (2024). Sustainable aviation fuel technologies, costs, emissions, policies, and markets: A critical review. Journal of cleaner production, 449, 141472.

[2] Zhang, F., & Graham, D. J. (2020). Air transport and economic growth: a review of the impact mechanism and causal relationships. Transport Reviews, 40(4), 506-528.
[3] Bauen, A., Bitossi, N., German, L., Harris, A., & Leow, K. (2020). Sustainable Aviation Fuels: Status, challenges and prospects of drop-in liquid fuels, hydrogen and electrification in aviation. Johnson Matthey Technology Review, 64(3), 263-278.

Number of doctoral students: 1

Form of study: part-time