

INPLASY

Factors associated with freight trip generation: a systematic review and meta-regression of econometric studies

INPLASY202640015

doi: 10.37766/inplasy2026.4.0015

Received: 5 April 2026

Published: 5 April 2026

Fonseca-Soler, AJ; González-Calderón CA; Aldana-Ramírez, CM; Muñoz-Hoyos, CH; Moreno-Palacio, DP.

Corresponding author:

Andrey Julian Fonseca-Soler

anfonsecas@unal.edu.co

Author Affiliation:

Centro de Investigación en Ciencias de Información Geoespacial (MEXICO).

ADMINISTRATIVE INFORMATION

Support - Not applicable.

Review Stage at time of this submission - Piloting of the study selection process.

Conflicts of interest - None declared.

INPLASY registration number: INPLASY202640015

Amendments - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 5 April 2026 and was last updated on 5 April 2026.

INTRODUCTION

Review question / Objective Which factors significantly influence freight trip generation when applying econometric models?

Rationale Studies on freight trip generation and modeling report considerable heterogeneity in methodological choices, model specifications, and explanatory variables (Córdoba-Misas, Calderón, and Brakewood 2026). This creates a practical challenge for researchers seeking to develop comparable models or derive consistent inferences: similar results may be reported using different measurement units or model families that alter the direction (or statistical significance) of the explanatory factors. In this context, there is a need to systematically synthesize empirical evidence to build a robust conceptual framework capable of identifying consistent patterns regarding which factors explain freight trip generation, including cases where spatial structures are incorporated, such as spatial spillover dependence or spatial error autocorrelation.

Condition being studied Factors influencing freight trip generation (e.g. economic, social, demographic, public-administrative configuration, accessibility, logistics-related, and firm-level factors).

METHODS

Search strategy We will search several databases using a combination of keywords in English, Spanish, and Portuguese. The search strategy will be adapted to each database interface (e.g., Web of Science, Scopus, TRID).

Example Search String (Scopus/WoS):

TS=(
 "freight trip generation" OR
 "freight generation" OR
 "freight trip production" OR
 "freight trip attraction" OR
 "freight attraction" OR
 (freight AND (trip* OR travel OR generation OR
 production OR attraction)) OR

(goods AND (trip* OR travel OR generation OR production OR attraction)) OR
 (cargo AND (trip* OR travel OR generation OR production OR attraction)) OR
 (logistics AND (trip* OR travel OR generation OR production OR attraction)) OR

"generación de viajes de carga" OR
 "generación de carga" OR
 "producción de viajes de carga" OR
 "atracción de viajes de carga" OR
 "atracción de carga" OR
 ("transporte de carga" AND (viaje* OR generación OR producción OR atracción)) OR
 ("transportación de carga" AND (viaje* OR generación OR producción OR atracción)) OR
 (carga AND (viaje* OR desplazamiento* OR generación OR producción OR atracción)) OR
 (mercancías AND (viaje* OR desplazamiento* OR generación OR producción OR atracción)) OR
 (logística AND (viaje* OR desplazamiento* OR generación OR producción OR atracción)) OR

"geração de viagens de carga" OR
 "geração de carga" OR
 "produção de viagens de carga" OR
 "atração de viagens de carga" OR
 "atração de carga" OR
 ("transporte de cargas" AND (viagem* OR geração OR produção OR atração)) OR
 (carga AND (viagem* OR deslocamento* OR geração OR produção OR atração)) OR
 (mercadorias AND (viagem* OR deslocamento* OR geração OR produção OR atração)) OR
 (logística AND (viagem* OR deslocamento* OR geração OR produção OR atração))

)
 AND
 TS=(
 econometric* OR regression* OR
 "spatial econometric*" OR "spatial regression" OR
 econometría OR regresión OR
 "econometría espacial" OR "regresión espacial"
 OR
 econometria OR regressão OR
 "econometria espacial" OR "regressão espacial"
)

Additional filters:
 Language: Spanish, Portuguese, English.

Participant or population Empirical studies reporting quantitative models of freight trip generation at different spatial scales (e.g., establishments, transport zones, municipalities, or postal codes).

Intervention Not applicable.

Comparator Comparisons will be based on the estimated relationships between explanatory variables and freight trip generation across different econometric model specifications.

Study designs to be included Journal articles.

Eligibility criteria Inclusion: Studies reporting freight trip generation models with clear explanatory variables, reporting coefficients, and measures of uncertainty (standard errors, t-stats, or p-values).

Exclusion: Purely qualitative studies, theoretical papers without empirical data, or studies not related to freight transport.

Information sources Web of Science, Scopus, TRID, Redalyc, SciELO, OpenAIRE, CORE, RePEc, and E-Journals.

Main outcome(s) Magnitude (effect size), statistical significance of the explanatory variables.

Additional outcome(s) Model performance metrics (R-squared, AIC, BIC, Log-Likelihood) and spatial characteristics, weight matrix (W) used, spillover and spatial dependence.

Data management References will be managed in Zotero. Data extraction will be performed using Ryyan. Meta-analysis and meta-regression will be conducted using the 'metafor' package in R.

Quality assessment / Risk of bias analysis The methodological quality of the included studies will be assessed using criteria adapted for observational econometric studies. The assessment will consider: (i) clarity of model specification, (ii) reporting of coefficients and uncertainty measures (standard errors, t-statistics, or p-values), (iii) treatment of spatial dependence when applicable, (iv) transparency in the definition of variables and spatial units, and (v) robustness checks reported by the authors.

In addition, potential publication bias and heterogeneity will be evaluated during the quantitative synthesis using funnel plots and statistical tests (e.g., Egger test and heterogeneity statistics).

Strategy of data synthesis First, a systematic review will be conducted to systematically identify and extract methodological characteristics from existing studies, followed by a meta-regression analysis to examine the effects of spatial and non-spatial econometric specifications.

Subgroup analysis Subgroup analyses will be conducted to explore potential sources of heterogeneity in the reported relationships between explanatory variables and freight trip generation. The following pre-specified factors will be examined:

- Type of econometric model (traditional regression vs spatial econometric models).
- Spatial unit of analysis (establishment-level, transport zones, or administrative units).
- Type of dependent variable (freight trips or freight volume).

Sensitivity analysis Sensitivity analyses will be performed excluding studies with incomplete presentation of coefficients or uncertainty measures and testing alternative model specifications in the meta-regression analysis.

Language restriction English, Spanish, and Portuguese.

Country(ies) involved Mexico, United States, Colombia.

Keywords Freight trip generation; econometrics; meta-analysis; transport planning.

Dissemination plans Results will be submitted to high-impact journals in the field of transportation (e.g., Transportation Research Part A).

Contributions of each author

Author 1 - Andrey Julian Fonseca-Soler - Author 1 led and drafted wrote the manuscript.

Email: al.afonseca@centrogeo.edu.mx

Author 2 - Carlos Alberto González-Calderón - Author 2 drafted wrote the manuscript.

Email: ca.gc@charlotte.edu

Author 3 - Claudia Marcela Aldana-Ramírez - Author 3 drafted wrote the manuscript.

Email: caaldana@unal.edu.co

Author 4 - Claudia Helena Muñoz-Hoyos - Author 4 drafted wrote the manuscript.

Email: chmunozh@unal.edu.co

Author 5 - Diana Patricia Moreno-Palacio - Author 5 drafted wrote the manuscript.

Email: patricia.moreno@udea.edu.co