Working papers regional urban economics - Impact of natural disasters on the Vía Panamericana on Freight transportation

Download Keep in mind
The series *Documentos de trabajo sobre economía regional y urbana* (only in Spanish, Working Papers on Regional and Urban Economics) is a publication of Banco de la República in Cartagena. The opinions contained in this document are the sole responsibility of the authors and do not commit Banco de la República or its Board of Directors.

AUTHORS AND/OR EDITORS Ayala-García, Jhorland Manjarres-Beleño, Leider Urueta-Polo, María
In terms of logistics performance, the model indicates small but statistically significant effects: in months with at least one closure, freight volumes along the corridor fall by about 1%, while the average cost per kilogram increases by roughly 1%.

Publication Date: Tuesday, 3 of March 2026 **Approach**
This study focuses on a corridor that is vital for the country's economic integration: the Pan-American Highway, which connects the southwest and the Coffee Region with the main production, consumption, and export hubs. To measure the logistics cost associated with its vulnerability to natural disasters, we construct a monthly database for 2017–2024 that integrates, on one hand, the closures reported by the National Roads Institute (Invías) and, on the other, data from the National Freight Dispatch Registry (RNDC) on transported quantities and their respective costs.

Using this data platform, we examine the relationship between road interruptions and freight movement. The empirical strategy relies on a gravity model, which allows us to identify the average effect of closures on two outcomes: (i) freight volume and (ii) cost per kilogram. The model incorporates dyadic fixed effects and origin-municipality-specific trends, ensuring that comparisons are made between comparable pairs and that results are not driven by structural differences in distance, topography, or market size.

Contribution
The main contribution is empirical: we assemble an integrated and updated database that matches Invías closures with monthly RNDC records for the municipalities directly connected by the Pan-American Highway—an uncommon exercise in the national literature for this corridor. As such, the document is pioneering in providing a quantification of the impact of natural disasters on regional logistics within the immediate area of influence of the Pan-American Highway.

This analysis provides relevant information for prioritizing investments aimed at preventing natural disasters that affect freight movement: slope stabilization and drainage works in steep sections, protection of detours, and strengthening of response capacities to reduce the effective duration of closures.

Results
Between 2017 and 2024, 128 closures associated with natural disasters were recorded along the Pan-American Highway. More than 70% were due to landslides and slope failures, with critical clusters in segments such as La Pintada–Medellín and Dabeiba–Santa Fe de Antioquia. The time series shows peaks (e.g., in 2018) and a marked decline in 2024, the year with the lowest number of closures in the analyzed segment.

In terms of logistics performance, the model indicates small but statistically significant effects: in months with at least one closure, freight volumes along the corridor fall by about 1%, while the average cost per kilogram increases by roughly 1%. These effects are consistent with a network that is disrupted but able to partially offset impacts through alternative routes and the short duration of most closures.

Fuente: https://d1b4gd4m8561gs.cloudfront.net/en/publications-research/working-papers-regional-urban-economics/impact-natural-disasters-via