A fair bidding system to reduce the squeeze in a drought-stricken Panama Canal

Climate change and geopolitics have created a perfect storm for global shipping. Creative thinking and a system of compensation could relieve the pressure.

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It has been a bad year for global trade logistics, with Houthi attacks in the Red Sea, drought in the Panama Canal and further shipping chaos in the form of the Francis Scott Key Bridge

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collapse in Baltimore. Falling water levels in Gatun Lake, which provides water for the system of locks on which the Panama Canal depends, have forced authorities to restrict the canal's capacity. Vessels are required to pay large fees in order to cross, and many are waiting up to a week in line to do so. This adds exponentially to costs and further disrupts global supply chains.

Currently, the canal allocates part of its capacity to pre-booked slots, which often end up with the big container shipping companies such as MSC, Maersk and Costco, securing that (at least some of) their ships will cross the canal in a timely manner. Whatever non-booked capacity remains is auctioned to the highest bidder.

In November 2023, one desperate ship bid $4 million — and still had to wait a week to get a slot. Other ships gave up and chose much longer alternative routes.

The current system not only favors the highest bidder, it also gives all funds to the canal authority and no compensation to ships that have been waiting for a long time.

Could a system that is fairer and economically more efficient be implemented?

Mihalis Markakis of IESE Business School believes a fairer, more efficient system is possible. Together with research collaborators from Imperial College Business School, he has developed a system of sequential bidding for merging traffic that could create more equitable queuing systems and provide some compensation for those forced to wait.

Managing traffic is usually a case of first in, first out, though lines can also be prioritized based on higher or lower urgency. Oftentimes this urgency manifests as a willingness to pay, and organizing lines in this way can make social and economic sense. However, it is also unfair, leaving those with less urgency having to wait, even if they arrived first.

In times of abundance, this may be a minor irritant, but when resources are scarce, lines need to be managed in a way that combines urgency and fairness.

Markakis proposes a real-time auction between all parties. Rather than bidding to the canal authorities to move up the line, backlogged ships must compensate the ship in front of them, and move from the tail to the head of the line in incremental, electronic bids. This allows those who have places to be to get priority slots, but not without compensating those ahead of them for their lost time and added costs.

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“A system like this doesn’t mean someone has to give up their spot in the line,” Markakis says. “But if they choose to, they’ll be compensated. They are, in effect, negotiating sequentially with people already in the line, according to how much each party values their time. If someone accepts a bid, that means it was beneficial to them to do so.”

The system was originally developed with road traffic in mind. With new technologies allowing such bidding to become automated, it was considered a plausible solution. However, Markakis cautions that the system wouldn’t work for every kind of line — for example, virtual lines, with limited transparency or visible presence, where “queue scalping” is already rife.

But for physical services — canals, roads or critical infrastructure in general — where large numbers of people are affected and resources are scarce, this mechanism offers two important advantages:

- it compensates those who are displaced, and
- negotiations occur directly between the people affected in a systemic way, without the need for a public or private body to intermediate.

Equality of access to public goods

Not merely a private company, the Panama Canal is integral to global trade. At a time when geopolitical tensions are disrupting other routes and the effects of climate change are accelerating, a problem in the canal is everyone’s problem. While the managing authority needs to be compensated, it is also crucial to keep an eye on social welfare and fairness.

“The system in place at the moment is economically efficient and earns a lot of money for the canal,” Markakis says, “but it’s fundamentally unfair: the big container shipping companies get priority to the detriment of small or medium-sized ones, further concentrating wealth.”

His mechanism doesn’t ensure powerful companies won’t bid their way to the front, but it could help smaller companies earn enough to cut their turn in line.

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