Lessons from transit reforms in intermediate cities of Colombia
An ex-post evaluation
Main lesson

Transit reforms should have users as their main concern

• What will they gain from reform?
  • Waiting time? Access time? Travel time? Fare? Comfort?

• Formalization per se does not benefit users much

• The reduction of externalities (traffic accidents and pollution) should not come at the expense of deteriorating travel experience for transit users

• I will illustrate these points with the case of SITM reforms in Colombia
SITM reforms in Colombia

Transit reforms for intermediate cities (more than 600k inhabitants)

• Formalization of operators and labor relations
• Gold standard BRT infrastructure with off-board payment system
• Electronic pre-payment cards
• Fleet renovation and articulated buses in trunk BRT services
• World class fleet management system
• City-wide network route reorganization to “rationalize” fleet and routes
• Trunk-feeder configuration for BRT services
SITM reforms 2006-2016

- Transmetro (Barranquilla, 2010) 14,0 kms.
- Megabus (Pereira, 2006) 15,5 kms.
- MIO (Cali, 2009) 36,07 kms.
- Transcaribe (Cartagena, 2016) 10,7 kms.
- Metrolínea (Bucaramanga, 2009) 17,6 kms.
- Metroplús (Medellín, 2011) 18,0 kms.
How to evaluate these experiences?

• Before and after?

• No, other things were happening at this time:
  • Economic growth
  • International trade agreements
  • Rising motorization rates
  • Motorcycle boom and motorcycles taxis emerged

• Need a counterfactual: what would have happened in these cities if reform has not been undertaken?
  • Use control group of cities without reform
Data

• National Urban Transport Survey (ENTU)

• 23 cities or metropolitan areas of Colombia

• Monthly information on passengers, commercial kilometers and vehicles in service

• Data for both reformed (SITM) services and traditional services in each city

• January 2005 to March 2018
Staggered difference in difference panel data model

Source: Goodman-Bacon (2018)
• Total passengers transported (both in reformed as well as traditional services) fell between 6% and 10% in cities with SITM

• Troubling since transit reform should aim at promoting public transport and not other, often less sustainable, modes of transport

Table 5: Results for the logarithm of total passengers per month, 2005-2018

<table>
<thead>
<tr>
<th></th>
<th>excluding Bogota</th>
<th>excluding Bogota and Medellin</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>(1)</td>
<td>(2)</td>
</tr>
<tr>
<td>All cities</td>
<td>-1.571</td>
<td>-2.261**</td>
</tr>
<tr>
<td>Large cities</td>
<td>(0.967)</td>
<td>(0.629)</td>
</tr>
<tr>
<td>All cities</td>
<td>-1.509</td>
<td>-2.119*</td>
</tr>
<tr>
<td>Large cities</td>
<td>(0.985)</td>
<td>(0.671)</td>
</tr>
<tr>
<td>SITM</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Obs.</td>
<td>3,338</td>
<td>1,749</td>
</tr>
<tr>
<td>$r^2$</td>
<td>0.202</td>
<td>0.634</td>
</tr>
<tr>
<td>$\Delta pax$</td>
<td>-6.4%</td>
<td>-9.2%</td>
</tr>
</tbody>
</table>

Notes: Robust (Huber-White) standard errors in parenthesis (* p < 0.05, ** p < 0.01). This estimation excludes the municipalities of Envigado and Riosaca. Large cities are those with at least five million passengers per month on average in 2007. All models include city fixed effects and monthly time effects. $\Delta pax$ is the impact of reform on the number of passengers at the average value of the variable SITM for the treatment period for cities that implemented these reforms.
Example. Bucaramanga
Demand was much lower than expected for SITM

Table 2: Ex-ante projections and effective demand for SITM (pax/day)

<table>
<thead>
<tr>
<th></th>
<th>Barranquilla</th>
<th>Bucaramanga</th>
<th>Cali</th>
<th>Cartagena</th>
<th>Medellin</th>
<th>Pereira</th>
</tr>
</thead>
<tbody>
<tr>
<td>Projected</td>
<td>305,000</td>
<td>387,500</td>
<td>960,000</td>
<td>452,000</td>
<td>176,500</td>
<td>140,000</td>
</tr>
<tr>
<td>Real</td>
<td>102,463</td>
<td>137,585</td>
<td>468,398</td>
<td>90,682</td>
<td>133,557</td>
<td>90,288</td>
</tr>
<tr>
<td>Real/projected</td>
<td>33.6%</td>
<td>35.5%</td>
<td>48.8%</td>
<td>22%</td>
<td>75.7%</td>
<td>64.5%</td>
</tr>
</tbody>
</table>

*Source: DNP (2016) except for Cartagena. This information is as of March 2015 for these cities and is consistent with that reported by Fedesarrollo (2013) a few years earlier. The information from Cartagena is for 2017 and comes from Cartagena cómovamos (2017). In this last city, projected demand is for 2020 when all routes are in operation while effective demand is for 2017. The system currently operates with 170 buses. There are 329 additional buses expected to enter operation by 2020. Even under an optimistic assumption that the additional services carry the same demand per bus as those already in operation, total demand would be 175.5 thousand passengers per day, less than 40% of expected demand.*
Financial and operational problems for new systems
Reforms were expensive:
• Bus renovation
• Electronic payment and fleet management systems
• Fomalization of operators and drivers
• Infrastructure

How these additional costs were funded:
• National government funded large part of infrastructure investment
• But no operational subsidies, so additional operational and fleet costs were funded by:
  • Reducing fleet size
  • Network restructuring (less routes, more transfers between services)
Impact on users: less coverage and transfers

Direct point to point service from A to C

With less coverage user must now walk from A to B, take a bus at B, then change to another bus to reach C
Impact on users: less fleet

*Big fleet = more frequency = less waiting time*

Waiting time

Waiting time

Waiting time

*Small fleet = less frequency = higher waiting time and more crowded buses*

Waiting time
Summary of SITM reforms in Colombia

• Well meant but costly reforms

• No subsidies to fund additional operational costs (only for infrastructure), nor were fares increased

• Reforms were funded implicitly by reducing fleet size, reducing route coverage and a trunk-feeder network configuration that forced users to make more transfers to complete their trips

• This increased the cost (time and money) of travel by public transport and users decided to use other modes
Other cases in Latin America

• Transantiago (Chile)

• Panamá City

• SITP, Bogotá (Colombia)
Are there cheaper and simpler options?

• Need not implement all elements of reforms from the start

• Bus priority systems do not need to be full BRT (Concepción, Chile)

• Other bus priority options (Temuco, Chile)
Another example of a well meant reform with unexpected results

Without Impact Evaluation the diagnosis was not so clear to academics and authorities, even years after some of the reforms were implemented

I understand that the Colombian government is now revising its transport policy (SETP, SITP)
Conclusions II

• Always ask yourselves: how will the average passenger (existing or potential) benefit from the reform?

• Will she/he walk less to a bus stop?
• Will she/he wait more or less for a bus?
• Will she/he travel faster once in the bus?
• Will she/he travel seated more often?

• If the answers to these questions are “no” then reform must be revised and re-designed, not only for the benefit of users but also for the financial and operational success of reform.