

Comments

Mauricio Cárdenas: This is a very interesting paper on a subject that is highly relevant and relatively ignored by the profession. The success story of TransMilenio has received ample press coverage in Colombia and elsewhere, but little academic attention. This public policy initiative was able to change an entrenched status quo and deliver positive results in a short period. Since other large cities are following the example of Bogotá, it is valuable to understand the main features of the new scheme, including its limitations and main challenges.

The authors discuss many dimensions of the problem of organizing transportation in large cities. The paper provides useful analysis and data on the optimal amount of intervention in urban transportation and the type of intervention that works best in developing countries. The paper discusses the cost effectiveness of different kinds of intervention and their impact on living standards, particularly the health impact of air quality.

The experience of Bogotá is characteristic of many large cities in the developing world. Bogotá tried for decades to deal with market failures associated with transportation systems, experimenting with solutions such as trolley buses and publicly owned and operated buses. Based on the information shown in the paper, these policies tended to exacerbate, rather than resolve, market failures. This is what the authors call the pervasiveness of huge service inefficiencies, and it is reflected in variables such as the excessive number of buses, the low average speed of circulation, the high frequency of accidents, and the low air quality. TransMilenio has not solved all the problems, however, and many inefficiencies are still present today. For example, the authorities of Bogotá have been unable to regulate the flow of buses originating in conjoining municipalities that circulate in the city. Also, TransMilenio has increased multileg trips and, hence, the total fare costs for the average user.

The paper emphasizes the excessive number of private cars in the city. However, contrary to the conventional wisdom that guides policies in the sector, Bogotá has only 130 cars per 1,000 inhabitants, far fewer than

other cities of similar size and per capita income. For example, Curitiba, Brazil, which was one of the early and influential adopters of a bus rapid transit system, has 300 cars per 1,000 inhabitants. Other international comparisons suggest that rather than having too many cars, Bogotá has too few kilometers of paved roads. Since per capita income is rising, vehicle demand will undoubtedly continue to increase rapidly, more so after trade liberalization has lowered the cost of many durable goods, including automobiles. Consequently, while TransMilenio can solve some traffic problems and reduce commuters' travel time, the contribution will be short-lived unless important investments are made in additional infrastructure or policies are adopted to discourage the use of cars through market mechanisms.

The institutional aspects of TransMilenio are also of interest. The creation of an entity relatively insulated from political competition was critical for attracting individuals with better technical qualifications, who are paid competitive salaries. The paper sometimes favors the role of individuals, but the fact that the system has been maintained and improved with the passage of time speaks well of institutional features. The adoption and expansion of the system has been the responsibility of three successive municipal administrations that have shown important ideological differences on other issues. This suggests that the institutions were designed in a way that prevented policy volatility.

The public policies behind the TransMilenio system have not only been stable, in the sense of remaining in place beyond the tenure of political officeholders, but they have also been flexible. The system is not based on rigid rules, so the authorities have been able to fine-tune important aspects, most notably in relation to the bidding criteria and the contractual design. Recent contracts have thus transferred more risks and fewer revenues to the private sector concessionaires. The various agents involved in the process have exhibited a good amount of coherence and coordination, including the different agencies in charge of building the infrastructure and the company that operates the system. The policymaking process has generated incentives for increasing efficiency in delivery. Most important, policies have generated broad (as opposed to concentrated) benefits, resembling true public goods.

This brings me to the political economy of the implementation, which is one of the most interesting and relevant aspects of the paper. I agree with much of what is said and with the overall spirit of the argument, but four aspects merit greater emphasis. First, the institutional reform in the city of

Bogotá (implemented in 1993) was a consequence of the 1991 Constitution. This enhanced the powers of the mayor and reduced the influence of the city council. Prior to 1993, the city council coadministered the city, especially in relation to public utilities and transportation policies. Corruption was rampant. Privatizing public utilities and changing transportation policies would have been very difficult without that reform. Second, privatization and fiscal reform allowed the city to improve its finances, providing the necessary resources for a large investment project such as TransMilenio. Third, given the electoral importance of the capital city, the presidential candidates in the 1998 election supported the idea of committing national funds to the public transportation system for Bogotá. The question was whether to build a metro or a bus-based system like TransMilenio. The economic technocracy of the national government ruled out the metro and opted for TransMilenio because it was the only fiscally feasible alternative. In fact, the national government actually chose the TransMilenio solution while the city administration was still considering the metro as an option. This decision carried political costs because it was seen by the public as an inferior solution to the transportation problems of the city, but in truth it is a much better solution. TransMilenio's area of influence (500 meters on each side of the busway) covers 85 percent of the urban area, whereas the metro would have covered only 8 percent of the city. In addition, the metro's infrastructure would have cost twice as much as TransMilenio's and its operation twenty times more. Fourth, multilateral banks did not have an important role in this process. Conversations on a credit facility for the construction of infrastructure for a bus rapid transit system started in 1986. These loans never materialized and had endless obstacles. Cities in need of overhauling their transportation systems cannot count exclusively on the advice of multilateral banks.

As the authors rightly point out, congestion, pollution, and traffic accidents fell significantly in TransMilenio corridors, explaining why the partial cost-benefit analysis is positive. When they look at the general equilibrium effects, they find that the opposite is actually true, mainly because congestion increased in the unserved corridors, where more buses continue to compete for passengers. The authors use difference-in-differences calculations to show that emissions have increased in unserved corridors, more than offsetting the reductions in TransMilenio corridors. These calculations are sensitive to the number of data points (before and after TransMilenio) and the number of monitoring stations, among other factors. The value of time, the value of life, and the conversion of emissions into monetary

amounts also make the results sensitive to specific assumptions. Therefore, the results should not be taken as unambiguous proof that TransMilenio has had a short-run negative impact. However, I fully share the authors' view in favor of speeding up the process of implementation of TransMilenio and improving the regulatory framework that applies to traditional public transportation in order to minimize the potential downsides of the scheme. These are important lessons for other cities building on the experience of Bogotá.

Andrés Gómez-Lobo: The paper analyzes the origins, justification, and results of TransMilenio, an urban transport plan introduced in Bogotá, Colombia, in 2000. Urban transport policy is not a prominent issue in the discussions of economists who study Latin America, but it nonetheless merits more attention from specialists. The macroeconomic costs of having a large portion of the population wasting several productive hours a day traveling to work or the extra costs for companies that need to distribute products throughout a city are rarely measured. Urban transport efficiency may be just as important for economic development as the sophistication and efficiency of other network industries such as telecommunications. This paper, insofar as it presents a novel experience in urban transport policy, is relevant for countries throughout the region.

Gwilliam points out that in developing countries urban bus services are usually characterized by competition in the market.¹ Competition among urban transport providers has been suspect as a welfare maximizing policy, however, since Chadwick's famous article advocating competition *for* the market rather than *in* the market for certain industries, including urban transport.² Interestingly, the market failures of competitive urban bus transport markets are still not well understood from a theoretical perspective. Congestion in the absence of road pricing is an obvious and well-understood problem, but what is more puzzling is why fares seem to increase rather than decrease when competition is introduced.³ The ensuing high tariffs generate excessive entry into the industry, capacity utilization of each bus diminishes, and the final result is economically inefficient and socially harmful (for example, reduced safety and increased pollution).

This paper briefly reviews the arguments behind the observed market failures in urban bus markets. This is not the best part of the paper since

1. Gwilliam (2001).
2. Chadwick (1859).
3. Estache and Gómez-Lobo (2005).

some of the arguments are presented very succinctly and are thus out of focus. For example, the authors mention the principal-agent relationship between bus owners and drivers as a market failure. When owners are interested in the number of passengers carried, they will naturally try to align drivers' incentives with their own by offering drivers a share of each passenger's fare. There is no market failure here. The problem is that the owner does not take into account the externalities that these incentives generate in the form of more aggressive driving and frequency distortions.

The main aim of the paper, however, is not to review the theoretical literature, but rather to describe the transport reform in Bogotá and undertake a cost-benefit analysis of the first stages of this reform. There is a growing consensus among policymakers that state-of-the-art regulatory policy in the transport sector, at least for middle-income countries, involves what Estache and Gómez-Lobo call the hybrid system.⁴ In this scheme, the authorities design the network and impose quality standards, frequencies, and tariff integration, while the private sector operates the services under a concession system. Revenues are centralized, and operators are not paid according to the number of passengers carried but receive either a fixed fee or rate per kilometer traveled. This hybrid scheme avoids the most important failures associated with state-provided monopoly transport services, as well as the market failures of competition in the streets. This policy has been adopted in London and Curitiba, Brazil, and it will also be implemented in Santiago, Chile, in 2005. Bogotá's TransMilenio experience provides another interesting example of the application of this hybrid model, and its documentation and evaluation provides interesting lessons for policymakers worldwide.

What can one learn, then, from the experience of Bogotá? The current paper raises two sets of issues that are particularly interesting: first, the design of the concessions and the way risks are allocated among agents; and second, the evaluation of the benefits and costs of the reform, which produces two unexpected results. With regard to the design issue, a key point is the way contracts were designed for the bus operators in the main corridors. Since the authorities determine dispatch frequencies, the number of kilometers served is not under the operator's control. Operators are paid according to the kilometers actually served, however, to avoid competition on the road. It seems rational that operators should not face a demand risk that is not under their control, whereas the state is better suited to adminis-

4. Estache and Gómez-Lobo (2005).

ter this risk. This was achieved in Bogotá through a novel variable-length concession that is reminiscent of Engel, Fisher, and Galetovic's least-present-value-of-revenue concessions.⁵ If at the end of the tenth year the concessionaire has not served the number of kilometers stipulated in the contract, the concession is automatically extended. This design has several attractive properties, and a similar system has been adopted for the future reform in Santiago, Chile.

At the same time, this scheme has the disadvantage that since operators are shielded from demand risk, they will make no extra effort to take-on extra passengers or change route designs when demand patterns change. This will probably be a greater problem in routes outside the main corridors and in the periphery of the city where new neighborhoods may generate new transport demands. The TransMilenio planners wisely relaxed the payment method for feeder services by combining a payment per kilometer traveled with a payment per passenger carried, thereby providing incentives to cater to passengers' needs and demands in the feeder zones.

On the evaluation of the first stage of TransMilenio, the paper presents two surprising results that should be given serious attention by policymakers in other countries embarking on similar reforms. First, the reform was regressive. Those that benefited (that is, TransMilenio users) include a higher proportion of wealthy individuals than those that lost (namely, users of the traditional system). Given that infrastructure investments, which represent a large fraction of the costs of the reform, will be paid for not by users but by taxpayers in general, the distributional impact of the first stage of the reform is worrying. Second, the overall cost-benefit analysis shows that the extra pollution and congestion generated on unserved corridors more than offset the benefits on TransMilenio corridors.

The above two results suggest that it may be socially preferable to undertake a more comprehensive reform rather than implementing the system in a piecemeal fashion as in Bogotá. In Santiago, Chile, the reform of the bus transport system scheduled to start in August 2005 is all-encompassing, simultaneously changing the whole transport system of the metropolitan area. A few years will have to pass before it is evident whether the added costs and complexities of a citywide reform, as in Santiago, more than offset the benefits of avoiding some of the negative effects of the piecemeal approach used in Bogotá.

5. Engel, Fisher, and Galetovic (2001).

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