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Article

Access to public transport and labor informality

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Evidence-based policy making

Access to public transport and labor informality

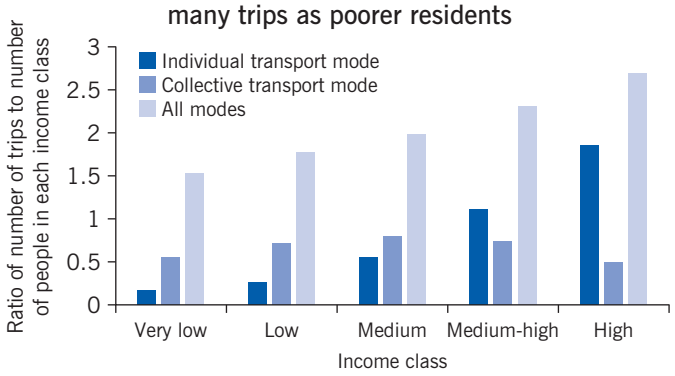
Poor public transport can reduce employment in the formal sector

Keywords: public transport, accessibility, informality, transport policy

ELEVATOR PITCH

Public transport infrastructure has not kept up with the demands of growing populations in cities in developing countries. Infrastructure provision has historically been biased against less affluent areas, so access to formal jobs is often difficult and costly for a large part of the lower-income population. As a result, low-income workers may be discouraged from commuting to formal jobs, lack information on job opportunities, and face discrimination. Through these channels, constrained accessibility can result in higher rates of job informality. Reducing informality can be a target for well-designed transport policies.

In São Paulo, wealthier residents take almost twice as many trips as poorer residents



Source: Metrô 2007 Origin–Destination Survey, "Síntese das Informações da Pesquisa Domiciliar" Report. Online at: http://www.stm.sp.gov.br/images/stories/Pitus/Pitu2025/Pdf/sintese_od_2007.pdf

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KEY FINDINGS

Pros

- Improvements in accessibility to public transport can lead to lower rates of informal employment.
- The availability of more and better public transport can increase access to information about job opportunities available to workers.
- Lower public transport costs can encourage lower-income workers to switch from home-based informal occupations to formal jobs, which are often concentrated in central areas.
- Lower commuting costs can have a positive impact on formal job creation through their effect on formal wages.

Cons

- Transport subsidies may have different effects on unemployed and informal workers, especially where informal employment offers an attractive alternative to formal employment.
- The channels through which constrained accessibility may result in higher informality are not yet fully identified.
- The design of appropriate transport policies requires more information on the commuting choices of informal workers.
- The effect of increased transport accessibility on job choices must be evaluated as part of the socio-economic impact of transport projects.

AUTHOR'S MAIN MESSAGE

The provision of more equitable transport can reduce urban inequality by broadening job choices. Better public transport may encourage low-income workers to switch from home-based informal occupations to formal jobs in central areas. Because the effects on informal employment of transport subsidies targeted to the poor are not entirely clear, policies should focus on strategically expanding the transport network to ensure all commuters a minimum level of provision and quality. Defining such a strategy is particularly relevant for cities facing large public transport project delays and tight budgetary constraints.

MOTIVATION

The bulk of formal jobs in developing countries are in central, high-income urban areas, while informal employment is concentrated in lower-income peripheral areas. This center-periphery division is reinforced by a suboptimal and skewed provision of urban public transport. For instance, in Bogotá, Colombia, thousands of low-income workers, most of them informal, are concentrated in the poor, southern part of the city. Traveling just 2–3 kilometers can take an average of 60 minutes. Meanwhile, traveling the same distance in the richer and less densely populated northern area of the city takes only 35 minutes [1]. Commuting is also financially more costly for the poor. The poorest residents of Bogotá spend more than 20% of their income on transport, whereas the richest spend only 5% [1]. Under these circumstances, can more equitable transport provision be a way to reduce labor informality?

DISCUSSION OF PROS AND CONS

In many large urban areas in the developing world today, a large segment of the lower-income population faces higher commuting costs, longer commuting distances, and longer commuting times for the same distance traveled. This situation has resulted from a history of transport infrastructure deficits, prioritization of cars over other transport modes, and, in some cases, lack of awareness of the benefits of more diverse and equitable transport provision. For example, on an average day in São Paulo, Brazil, the wealthiest residents take almost twice the number of trips as the poorest residents, who are mostly informal workers (see illustration on page 1). The difference reflects a low mobility index (ratio of the number of individual trips to the total number of people in each income class) for individual transport modes (for example, by car), which is not offset by a higher mobility index for collective transport modes (for example, buses and subways).

Although there are many potential channels through which constrained transport accessibility could lead to more informality, not much evidence is available on the job-related costs of insufficient, deficient, and skewed public transport. Informal workers tend to be concentrated in areas of deficient public transport. In general, informal workers face more precarious working conditions than formal workers: they may receive lower compensation, do not contribute (or have access) to the pension system, have no record of job experience or opportunities for advancement, are not eligible for subsidies and leave (maternity, sickness, vacation), and have difficulty getting credit. For the economy at large, the existence of informal employment implies losses in tax revenues and productivity, as well as a heavy burden of social protection costs [2].

Extending the spatial mismatch hypothesis to explain higher informal employment

Studies of the informal sector attribute its existence and persistence mainly to factors such as social protection subsidies and minimum wage regulations; the role of transport accessibility has hardly been examined. One exception is the extensive research on the spatial mismatch hypothesis, which looks at the relationship between accessibility and labor market outcomes, especially in the case of racial and ethnic minorities in US and European cities. The spatial mismatch hypothesis considers

The spatial mismatch hypothesis

The spatial mismatch hypothesis was inspired by the rapid residential suburbanization around metropolitan areas of the US in the second half of the 20th century. As people moved from the cities to the suburbs, firms also dispersed from central areas within cities to take advantage of agglomeration externalities (the benefits that firms obtain by locating near each other) in suburban areas and to escape increasing congestion and rent prices in cities. As minorities were slower to relocate, allegedly because of housing market discrimination and zoning regulations, there was an increase in the concentration of minorities in inner-city areas, where low-skilled job creation was slow.

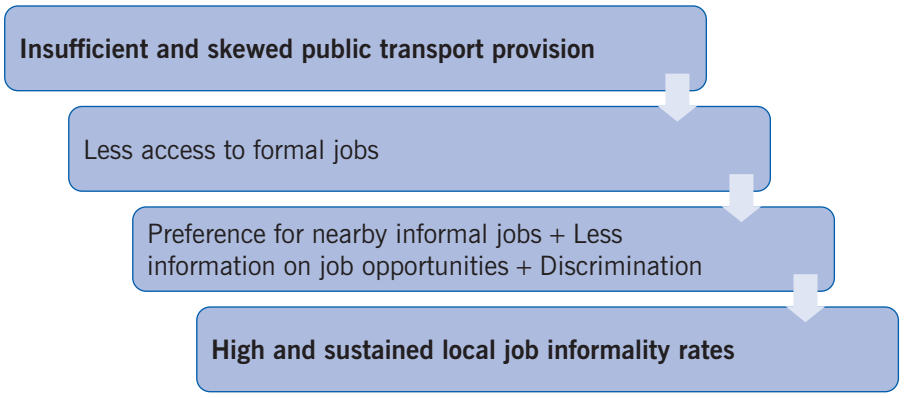
Source: Gobillon, L., H. Selod, and Y. Zenou. "The mechanisms of spatial mismatch." *Urban Studies* 44:12 (2007): 2401–2427; Moreno-Monroy, A. I., and F. Ramos. *The Impact of Public Transport Expansions on Informality: The Case of the São Paulo Metropolitan Region*. ERSA Conference Papers, 2015.

adverse labor market outcomes of minorities to be a result of spatial disconnection between low-skilled jobs and the places where minorities reside.

How can distance to jobs result in worse labor outcomes? The spatial mismatch literature identifies several mechanisms through which constrained physical access to jobs can result in more unemployment [3]. That analysis can be extended to explain how these mechanisms can lead to more informal employment. Figure 1 summarizes these mechanisms.

First, when commutes are long and costly, workers may decide to work informally from home instead of accepting an offer for a formal job farther away. Furthermore, lower-income workers in search of formal work opportunities may be reluctant to commute to central areas where formal jobs are concentrated, instead limiting their search to their local neighborhood, where informal employment may be more prevalent.

Figure 1. How poor public transport can lead to high job informality rates



Source: Author's own illustration.

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Second, lower-income workers residing in areas with poor transport accessibility may be discriminated against by employers. Formal employers may be concerned about the consequences of long commutes on workers' performance but yet be reluctant to offer compensation for commuting costs. These effects are likely to be more pronounced when formal jobs are centralized (when there are no large employment centers absorbing low-skilled workers in urban peripheral areas), when the gap between formal and informal wages is narrow, when home-based informal labor is common, and when the areas in which a substantial proportion of lower-income workers reside have poor public transport accessibility.

The spatial mismatch hypothesis has been tested empirically using different approaches. Because residential choices are not randomly assigned, the endogeneity of residential choice makes it methodologically challenging to estimate the causal effect of employment access on employment outcomes [3]. Some studies have used quasi-natural experiments and randomized controlled experiments, as well as statistical methods such as instrumental variables strategies, to distinguish the causal effect of accessibility on labor market outcomes. The findings are mostly supportive of the idea that constrained accessibility is partly responsible for the adverse job outcomes of racial and ethnic minority workers. However, some studies using regression models that do not correct for endogeneity find no effect of public transport-related variables on the unemployment rates of minorities, thus contradicting the main postulate of the spatial mismatch hypothesis.

Evidence on strategies to ease the negative effect of spatial mismatch

If accessibility is indeed a factor restricting workers from improving their work prospects, the right policies can counteract some of the negative effect of spatial mismatch. Proposed policies include expanding access to jobs by improving transport connectivity and lowering cost, moving jobs closer to workers, and moving workers closer to jobs. This section focuses on evidence for the first strategy, which can be realized by expanding transport networks and establishing transport subsidies.

Studies on transport expansion for the US and Europe that used quasi-experimental designs and difference-in-differences methods to isolate the effect of transport expansions on job outcomes and earnings find a direct and positive impact of improved accessibility [4], [5]. A seminal paper based on data on hiring before and after the expansion of the Bay Area Rapid Transit (BART) subway system in San Francisco finds that the hiring of Latino workers increased around a new station [4]. A recent study for Denmark uses panel data at the individual level to study the effect of opening

How difference-in-differences estimation isolates treatment effects

One way to deal with an inability to conduct an experimental design with random assignment to treatment and control groups is to use difference-in-differences estimation. Observational data can be used to compare the average change over time for the outcome variable in the treatment group with the average change over time for the outcome variable in the control group. The average change in the control group is then considered to reflect what the outcome would have been in the treatment group without the intervention.

a new subway station in Copenhagen [5]. It finds that improved public transport accessibility has a positive and significant impact on earnings through its effect on increased access to better paid jobs.

Additionally, there is recent evidence for the US on the effect of a transport subsidy for low-income workers from a study using an experimental design. The study finds support for the job search mechanism: previously unemployed individuals who received a public transport subsidy increased their job search intensity compared with individuals in the control group [6].

A particularly relevant study analyzes the effect of local improvements in public transport on local poverty rates using proximity to the subway in the outer boroughs of New York City and rail expansions in 16 other US metropolitan areas [7]. The study took place in the context of rapid suburbanization of jobs and concentration of car-less poor people, mostly African-Americans, in central cities. The underlying theoretical model considers two income groups, the rich and the poor, that choose between cars and public transport, with cars assumed to be faster and more expensive than public transport. The rich prefer car commuting and more housing space, while the poor seek proximity to public transport, the cheaper mode. Different urban configurations emerge from the model as the cost of cars as a share of income declines. Under specific values for the income elasticity of housing demand and other parameters, local poverty rates rise as a result of local improvements in public transport.

An obvious concern is how the different spatial structure of cities in developing and developed counties affects the predictions of the spatial mismatch literature. In US metropolitan areas, for example, residential density decreases with distance, and jobs have moved to the suburbs, with racial and ethnic minorities often living in planned social housing projects far from job centers. In developing countries, by contrast, jobs are concentrated in city centers, while dense informal housing settlements have sprung up in peripheral areas around large cities, where informal employment predominates and there are few formal jobs.

Studies for developing countries have focused on the effect of transport access on unemployment but have disregarded informal employment as a choice for workers who face high commuting costs. A recent study offers the first attempt to relate public transport access to informality rates by estimating the impact of public transport expansions on local informality rates for the São Paulo Metropolitan Region [8]. After controlling for endogenous selection by using a historical transport infrastructure plan as an instrument for transport expansions, the study finds that informality rates decline by about four percentage points in areas receiving new transport infrastructure compared to areas that were supposed to receive new transport infrastructure but did not because of project delays.

Another recent study is the first to use an experimental design to test the effect of accessibility constraints on labor market outcomes in a developing country setting [9]. The study finds that a transport subsidy can help reduce youth unemployment through its effect on job search intensity.

In contrast, however, another study uses a theoretical urban search model to investigate the impact of transport subsidies on informality rates [10]. The study finds that a transport subsidy targeted exclusively to informal workers may have no impact

on informality rates, while a non-targeted transport subsidy, or a subsidy targeted to formal workers, can lead to a reduction in informality rates. In this model, formal workers commute every day to the city center, where all formal jobs are concentrated. Informal workers commute less frequently, as they have the additional choice of working at or near home. In this context, formal firms have to offer a "spatial compensation" as part of the formal wage in order to attract workers because urban costs (commuting costs and housing rents) are higher for formal than for informal workers. Formal workers incur higher work-related commuting costs than informal workers because they commute more frequently to the city center. For the same reason, they prefer to live closer to the city center, even though housing rental costs are higher due to tight competition among workers seeking to minimize commuting costs. A transport subsidy targeted exclusively to informal workers raises the spatial compensation formal firms have to pay to attract workers because the subsidy lowers urban costs for informal workers, increasing the urban cost gap between formal and informal workers. A larger spatial compensation leads to higher formal wages and consequently to lower job creation in the formal sector and higher informality rates.

LIMITATIONS AND GAPS

As is clear from the analysis presented here, the empirical evidence on the effect of transport policies on job outcomes for developing countries is fairly scarce [11], [12]. This is surprising, as it is precisely cities in developing countries that face the most pressing mobility issues and that have the highest levels of segregation between low- and high-income workers. A focus on the channels through which constrained accessibility may result in higher informality may be particularly fruitful for informing the design of appropriate policies, as different channels may require very different approaches. New studies can take advantage of an extensive literature on the existence and persistence of informal sectors in developing countries and on the socio-economic impacts of transport infrastructure.

It is unclear to what extent these findings on the impact of improved accessibility for the US and Europe can be directly extended to developing countries. In US metropolitan areas, residential density decreases with distance, formal jobs have moved to the suburbs, and in some instances racial and ethnic minorities have been moved into planned social housing projects far from job centers. In contrast, peripheral areas of large cities in developing countries are the locus of dense informal housing settlements, with a predominance of informal employment and low availability of formal jobs. An obvious concern is how the different spatial structure of cities in developing and developed countries affects the predictions of the spatial mismatch literature. Are there additional mechanisms at work in developing countries because of the prevalence of informal employment?

Both the theoretical and the empirical evidence on the effect of transport expansion have focused on cases that assume a monocentric urban form—urban areas in which most jobs are concentrated within a single center. The effects clearly depend on the level of centralization of low-skilled formal employment. This urban structure seems to correspond to that of many large cities in developing countries; however, it is relevant to consider how the existence of alternative structures with multiple job sub-centers can affect the relationship between job accessibility and informality.

The role of cars in determining job outcomes also becomes relevant if new job sub-centers arise in areas with low public transport accessibility. Although there is a rich literature on polycentric cities and car accessibility for developed countries, the evidence for developing countries is still thin. Future research could consider the determinants of job decentralization in cities in developing countries, the relationship of evolving urban forms and public transport provision, and policies for moving jobs closer to workers that best reflect the role of polycentrism and choice of transport mode.

The empirical evidence on the effect of transport subsidies targeted to low-income groups is very narrow for Europe and the US and virtually nonexistent for developing countries. Knowing more is important, as these subsidies are likely to be part of broader equity policies. In Bogotá, for instance, a transport subsidy targeted to the poor has been implemented since 2014, but its effects on social outcomes are still unknown [10]. It would also be interesting to know how the impact of the subsidy evolves over time, and how it fares compared with other transport policies focused on expanding the urban transport network and improving the quality of transport services.

Along these lines, more evidence is needed on the mediating effect of transport access on policies that seek to move workers closer to jobs, such as residential mobility subsidies. Recent studies indicate the importance of considering job accessibility in programs to reduce residential segregation. In particular, in developing countries, residential mobility vouchers can be made conditional on relocating closer to suitable formal jobs [12], taking into account the location patterns of new low-skilled jobs and transport options.

Furthermore, studies of transport policies have focused on the effect of transport access on unemployment but have failed to consider that workers may find employment in the informal sector. Unemployed and informal workers may have different sensitivities to changes in the cost of accessibility, particularly where informal employment is an attractive alternative to formal employment. Evaluations of transport policies in local communities should also consider the size and composition of the local informal sector. More evidence is needed on the transport choices of informal workers in different areas of cities. It would be particularly relevant to know to what extent, both qualitatively and quantitatively, improved access would motivate different types of informal workers to switch to formal jobs located far from their residence.

There are also limitations to the current evidence for developing countries. The quasi-experimental and experimental evidence is preliminary [8], [9] and cannot be generalized to other cities or time periods and fails to account for possible feedback or general equilibrium effects. Theoretical work identifies plausible channels through which changes in accessibility can affect informality, but these have not been subject to empirical research.

Finally, how transport infrastructure affects employment choices where informal jobs are an option requires more study. There is a body of literature on transport and equity in developed countries that suggests the importance of considering the impact of transport infrastructure projects on socio-economic outcomes related to inequality [13]. Similar studies of the effects of transport projects on inequality and

segregation are needed for developing countries, particularly through their direct and indirect effects on the employment choices of lower income workers.

SUMMARY AND POLICY ADVICE

Difficulty getting to areas with concentrations of formal jobs because of gaps in public transport may be partly responsible for the existence and persistence of informal employment in cities in developing countries. The possible channels connecting public transport to job accessibility and informality include a preference for home- or neighborhood-based informal occupations over formal jobs because of high commuting costs to the areas where formal employment is concentrated, less information about formal job opportunities because of difficult access, and discrimination by employers based on place of residency.

Although more evidence is needed on the extent of the problem and the precise channels through which it occurs, enough is known to suggest that the impact of public transport infrastructure projects on job choices should be considered within a wider agenda of more equitable transport systems. Because low-income workers are particularly dependent on public transport, better access to public transport can reduce inequality by improving labor market outcomes. Transport policies should focus on expanding the public transport network in an effective and strategic way, so that all commuters are ensured at least a minimum level of transport provision and quality standards. Defining such a strategy is particularly important in cities experiencing large public transport project delays and tight budgetary constraints. If there is indeed a connection between inadequate access to formal jobs and higher levels of informality, other policy interventions may be needed to take into account any possible intended or unintended effects of these policies on the incentives to work informally. Examples include residential vouchers and transport subsidies that take into account the location patterns of new low-skilled jobs and transport options.

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Competing interests

The IZA World of Labor project is committed to the *IZA Guiding Principles of Research Integrity*. The author declares to have observed these principles.

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