

**Terms of Reference - Short Term Consultant  
Data Scientist/Research Analyst  
March 2019**

## **1. Summary**

The short-term consultant will work as a research team member for the research project: “Unveiling the impact of public transport fare policies in Bogota, Colombia”.

The consultant will support the geospatial and econometric analysis of automatic fare collection (AFC) data and household survey data. He/she will analyze the changes in mobility as a result of transit fare policy changes – including fare subsidies and cost of transfers. We seek candidates with expertise with geo-spatial analysis and big data, with emphasis in urban planning and transportation. Knowledge of econometric analysis is preferred.

This is a short-term-consultancy for 30 non-consecutive days. The start date is ideally April 2019, with some flexibility, and with potential for working flexible hours. The STC contract can be extended based on performance and project development.

## **2. Background**

This research activity is being jointly implemented by the Development Economics Impact Evaluation (DECIE) group and the Transport Global Practice (GP). DECIE is a unit of the World Bank's Development Research Group whose purpose is to increase the use of impact evaluation (IE) in the design and implementation of public policy, and to develop institutional capacity for evidence-based policy. This project falls within the ieConnect for Impact program, a joint initiative between DECIE and the Transport GP, which focuses on impact evaluations that can help to provide transformative evidence and analysis for the transport sector.

### *Fare Policy in Bogota, Colombia*

Bogota is a pioneer in experimenting with public transport fare policies, including the implementation of a city-wide and fully-targeted transit fare subsidy scheme for low-income populations, which is unprecedented in public transport. The subsidy structure implemented in 2014 targeted the poorest households, based on socio-economic indicators that identified beneficiaries of social programs (SISBEN). The policy was revised in 2017, when the municipality re-designed the subsidy program to improve targeting efficiency and to make it more financially sustainable. At the same time, the municipality eliminated transfer surcharges, and allowed users to hold a negative balance of up to two trips in their smartcard.

This impact evaluation aims at quantifying the impact of these policy changes on mobility and on labor market outcomes, time use, and quality of life. Using travel data from personalized smartcards and socio-

economic data at the block level, we propose to use quasi-experimental methods for impact evaluation to estimate how the changes may have affected the specific pattern of mobility by income group. In addition, the impact evaluation seeks to estimate how these changes may have contributed to changes in labor markets.

### **3. Tasks**

The consultant will work on the geospatial and econometric analysis of AFC data and household survey data, including:

- Initial cleaning of the AFC data including summary statistics, identification of outliers, identification of potential problems with the data or challenges in utilizing the data
- Identification of typology of mobility patterns from the AFC data, assigning users to groups based on travel behaviors, as well as writing preliminary analysis and reports of the results
- Creating maps to identify mobility patterns in Bogota;
- Calculate statistics at the user level and at the locality level based on the analysis of AFC data and household data;
- Produce replicable code for calculating user statistics that is efficient for big data
- Use econometric analysis to estimate the impact of fare policy changes
- Support the production of technical and academic papers, policy briefs, presentations or other written products based on the analyses produced, including preparing necessary graphics and tables
- Documenting his/her work electronically

### **4. Requirements**

The consultant should present the following qualifications:

- Master's degree (or pursuing a degree) in economics, data science, urban planning, or other relevant disciplines
- Experience in developing technology and using big data to study economic and urban issues
- Experience writing algorithms to analyze big datasets
- Advanced programming skills in Stata or R, and Python.
- Advanced skills in working with geospatial software such as ArcGIS or QGIS, including creating maps, analyzing geospatial data, and producing new geospatial datasets
- Experience working on a research project, both independently and as part of a larger research team
- Excellent verbal and written communication skills in English is required. Reading and writing knowledge of Spanish is desirable but not required.

## **5. Reporting**

The consultant will report to Sveta Milusheva (Economist) and Javier Morales Sarriera (Economist), who will be co-supervising and coordinating the project. The consultant will interact with other team members from the World Bank.

## **6. Compensation, Duration and Logistical Arrangements**

The consultant will be remunerated according to World Bank scales. The duration of the contract is for 30 non-consecutive days starting in April 2019, which could be extended based on performance and project development. Ideally, the STC should be able to perform most of the work based in Washington, DC (World Bank HQ), but arrangements for working remotely are possible.

## **7. Data Confidentiality and Intellectual Property**

The consultant agrees to handle all data in a strictly confidential manner. Any material created in the fulfillment of this contract, including documents, data, copyrights, patents, trademarks, or other proprietary rights in and to the work will fall under the exclusive ownership of the World Bank Group. This material may not be disclosed publicly or to third parties without the prior written consent of the World Bank Group. Furthermore, disclosure of information must be in line with any data sharing agreements between the World Bank Group and its clients or partners, and with the data sharing policies of the World Bank Group

## **8. Application Procedure**

Interested candidates should submit their CVs and cover letter to Sveta Milusheva ([smilusheva@worldbank.org](mailto:smilusheva@worldbank.org)) and Javier Morales Sarriera ([jmoralessarriera@worldbank.org](mailto:jmoralessarriera@worldbank.org)) by March 20, with the subject "Data Scientist Application (Colombia)." We will be interviewing candidates as they send their application and may make the hiring decision before this deadline if we find a suitable candidate.