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Understanding the Relationship between Short and Long Term Mobility

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June 2017

Please cite this paper as:

MILUSHEVA, S., E. zu ERBACH-SCHOENBERG, L. BENGTTSSON, E. WETTER and A. TATEM (2017), "Understanding the Relationship between Short and Long Term Mobility", *AFD Research Paper Series*, No. 2017-69, June.

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ISSN 2492 - 2846

Understanding the Relationship between Short and Long Term Mobility

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Abstract

Populations are highly mobile, both in terms of long term movements of individuals relocating their place of residence as well as shorter term mobility such as commuting, seasonal travel and recreational trips. Working with call detail record data from Namibia and Senegal, we study population migration and its link to short term movement. We compare the short term mobility estimates extracted from call detail records to census data in the two countries and find a strong annual relationship, as well as distinct daily patterns in the relationship between long and short term movement. The relationship is strongest for holidays, and we find it to be consistent both across countries as well as across multiple years. In particular, we observe periods of increased travel on migration routes around holidays, with net short term travel in the opposite direction of the direction of migration before the holiday and net travel in the same direction after. Using the Namibia data set, which spans several years, we investigate the link between short term mobility and long term relocation on an individual level, allowing us to gain insights into the mechanisms of interaction of short and long term mobility. We find that it is common for individuals to both visit the place they will migrate to prior to migration and also visit their place of origin after migrating. Additionally, distance between the origin and destination of a migration has a significant influence on the probability of a short term trip associated with a long term move.

The Senegal dataset provides information on the full network of users, which we use to study the relationship between the location of network contacts and probability of traveling to those locations, investigating the importance of social contacts for mobility.

We find that while the majority of social contacts in different regions can be explained by long term migration patterns between regions, which in turn are linked to short term movement patterns, social contacts can explain some of the additional short term movement not captured by the long term migration. We also find non-linear relationships between the probability of visiting a region and the number and strength of contacts, as well as between the duration of a visit and social contacts. These results can help inform evidence-based policies that target some of the negative externalities of short term population movement such as spread of infectious disease, increased congestion, and inadequate infrastructure.

Key words: Migration, Big data, Call detail Records

JEL Classification: O15, R23, C8, C88, C89

Original version: English

Accepted: July 2017

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