Regional Market Integration and City Growth in East Africa: Local but no Regional Effects?

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May 2016
Regional market integration: A magic bullet to unleash Africa’s potential?
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- Distributional consequences are little understood
Motivation

Regional market integration: A magic bullet to unleash Africa’s potential?

- Distributional consequences are little understood
- Increasing concentration continues to be a dilemma for policy makers
Research Question and Contribution

Did the economic geography of cities change after the establishment of the East African Community (EAC) in 2001?
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▶ Trade-induced spatial effects (e.g. Henderson, 1982; Krugman & Venables, 1995; Helpman, 1998; Redding & Sturm, 2008)
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- Trade-induced spatial effects (e.g. Henderson, 1982; Krugman & Venables, 1995; Helpman, 1998; Redding & Sturm, 2008)
- Stability of urban systems (e.g. Davis & Weinstein, 2002; Miguel & Roland, 2011; Jedwab & Moradi, 2016).
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▶ Stability of urban systems (e.g. Davis & Weinstein, 2002; Miguel & Roland, 2011; Jedwab & Moradi, 2016).

We are the first to examine these trade-induced spatial effects of RTAs on city growth in a context where countries are similarly poor, largely agrarian, and undergoing structural transformation.
The East African Community

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Historical evidence gathered from policy documents shows that this marked a change in the countries’ trade policy:

- With almost immediate effect EAC member states started to remove discretionary duties on regional imports.
- Countries embarked on significant trade facilitation efforts.
EAC Economic Geography

- Focus on founding members of EAC: Kenya, Tanzania and Uganda.
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- Distance to border assuming different max. travel speeds on each type of road.
### Table 1: Summary Statistics (excluding capitals)

<table>
<thead>
<tr>
<th></th>
<th>Non-Border City</th>
<th>Border City</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Cities</td>
<td>156</td>
<td>21</td>
</tr>
<tr>
<td>1992 Nightlights</td>
<td>924</td>
<td>874</td>
</tr>
<tr>
<td>1992 Population</td>
<td>31,299</td>
<td>23,457</td>
</tr>
<tr>
<td>1992 Domestic Market Access (DMA)</td>
<td>495,564</td>
<td>506,495</td>
</tr>
<tr>
<td>1992 Regional Market Potential (RMA)</td>
<td>326,421</td>
<td>679,672</td>
</tr>
</tbody>
</table>

DMA of city i: Sum of the population of all cities \(j \neq i\) within same country weighted by the inverse of the travel time between i and j.

RMA of city j: Sum of the population of all cities outside the country weighted by the inverse of the travel time between i and j.
In line with the literature, we expect the EAC to have a decreasing impact on the growth of cities as distance to the internal border increases.
Main Hypothesis

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- **Before EAC:** The combination of a peripheral location and structural transformation is likely to put border cities at a disadvantage.
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- **After EAC:** Border cities have higher regional market potential and are thus likely to exhibit a higher response to the opening of borders.
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- **Before EAC:** The combination of a peripheral location and structural transformation is likely to put border cities at a disadvantage.

- **After EAC:** Border cities have higher regional market potential and are thus likely to exhibit a higher response to the opening of borders.

What is less clear is whether we should expect these growth effects to be short- or long-lasting.
Baseline Specification(s)
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$$\Delta \log NL_{it} = \alpha_0 + \beta \text{Border}_i + \gamma (\text{Border}_i \times \text{EAC}_t) + \alpha_1 \Delta \text{HMA}_{it} + \alpha_2 \text{HMA}_{it} + \alpha_3 C_i + \alpha_4 d_t + \varepsilon_{it} \quad (1)$$
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(1)

\[ \beta < 0, \gamma > 0 \]
Baseline Specification(s)

\[
\Delta \log NL_{it} = \alpha_0 + \beta Border_i + \\
\gamma (Border_i \times EAC_t) + \\
\alpha_1 \Delta HMA_{it} + \alpha_2 HMA_{it} + \alpha_3 C_i + \alpha_4 d_t + \varepsilon_{it} \quad (1)
\]

\[
\beta < 0, \gamma > 0
\]

\[
\Delta \log NL_{it} = \alpha_0 + \beta Border_i + \\
\gamma_1 (Border_i \times EAC1_t) + \\
\gamma_2 (Border_i \times EAC2_t) + \\
\gamma_3 (Border_i \times EAC3_t) + \\
\alpha_1 \Delta HMA_{it} + \alpha_2 HMA_{it} + \alpha_3 C_i + \alpha_4 d_t + \varepsilon_{it} \quad (2)
\]
Identification Strategy

Our identification strategy exploits the timing of the EAC and varying treatment intensities.
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1. Specifications (1) and (2), to test for timing
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2. Augmented versions of (2), to test for varying treatment intensities:
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   - with distance to border
Identification Strategy

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1. Specifications (1) and (2), to test for timing

2. Augmented versions of (2), to test for varying treatment intensities:
   - with distance to border
   - with regional market potential
## Baseline Results

### Table 2: Baseline Regression

<table>
<thead>
<tr>
<th></th>
<th>(1)</th>
<th>(2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Border $\leq$ 90min</td>
<td>-0.009**</td>
<td>-0.009**</td>
</tr>
<tr>
<td></td>
<td>(0.015)</td>
<td>(0.009)</td>
</tr>
<tr>
<td>Border $\leq$ 90min $\times$ EAC</td>
<td>0.015**</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.006)</td>
<td></td>
</tr>
<tr>
<td>Border $\leq$ 90min $\times$ EAC 01-04</td>
<td></td>
<td>0.030***</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.009)</td>
</tr>
<tr>
<td>Border $\leq$ 90min $\times$ EAC 05-09</td>
<td>0.005</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.006)</td>
<td></td>
</tr>
<tr>
<td>Border $\leq$ 90min $\times$ EAC 10-13</td>
<td>0.008</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.007)</td>
<td></td>
</tr>
<tr>
<td>Home market access controls</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>Country, year, country-year FE</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>Observations</td>
<td>3,780</td>
<td>3,780</td>
</tr>
</tbody>
</table>
## Varying Treatment Intensities

### Table 3: Varying impact with distance to border

<table>
<thead>
<tr>
<th></th>
<th>Border ≤45min</th>
<th>45min &lt; Border ≤90min</th>
<th>90min &lt; Border ≤135min</th>
<th>135min &lt; Border ≤180min</th>
</tr>
</thead>
<tbody>
<tr>
<td>EAC 01-04</td>
<td>0.038***</td>
<td>0.025**</td>
<td>0.004</td>
<td>0.004</td>
</tr>
<tr>
<td></td>
<td>(0.011)</td>
<td>(0.011)</td>
<td>(0.008)</td>
<td>(0.007)</td>
</tr>
</tbody>
</table>

Notes: Controls for HMA, country, year, country-year, pre-EAC, EAC 05-13 not shown
## Varying Treatment Intensities

### Table 4: Varying impact with 1992 regional market potential (RMP)

<table>
<thead>
<tr>
<th></th>
<th>Border x 1992 RMP tertile 1</th>
<th>Border x 1992 RMP tertile 2</th>
<th>Border x 1992 RMP tertile 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>EAC 01-04</td>
<td>0.016 (0.010)</td>
<td>0.027** (0.012)</td>
<td>0.048*** (0.009)</td>
</tr>
</tbody>
</table>

Notes: Controls for HMA, country, year, country-year, pre-EAC, EAC 05-13 not shown
Local Effects

**Figure 1:** Ratio of nightlights in border city to nightlights in non-border city

![Graph showing the ratio of nightlights in border city to nightlights in non-border city over years with and without EAC.](image)
Regional Effects

Figure 2: Share of economic activity in border cities

Lights in border cities, share of total

Year


0.05 0.054 0.058 0.062 0.066 0.07 0.074

with EAC    without EAC
Conclusion

The establishment of the EAC had a marked asymmetric impact on city growth:

▶ Yet this effect was temporary in line with a one off levels effect with some gradual adjustment.

▶ Local effect is large: By 2013 economic activity in border cities is 21% larger relative to non-border cities than without EAC.

▶ Regional effect is small: By 2013 the share of economic activity emanating from border cities was only 1% point larger than without EAC.
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- Yet this effect was temporary in line with a one off levels effect with some gradual adjustment.

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Appendix

Data Construction
EAC Trade Policy
Intra-EAC Trade
Urban Concentration
Urban System
Robustness Test - Leads and Lags
Robustness Test - Border Falsification
Robustness Test - Levels Specification
Data construction

- Overlaying yearly nightlight images between 1992-2013 produces about 1700 separate light clusters.
- Outer envelope of overlaid images defines cluster boundaries.
- Annual nightlight measure for each cluster equal to sum of nightlights measure for each 0.86 km² grid cells falling within the boundary of cluster.
- Focus is on 250 on average most intensely lit clusters.
- 180 cluster can be linked to cities/towns in mainland Kenya, Tanzania, and Uganda.
EAC Trade Policy Early Measures

On January 31st, 2001, EAC trade ministers agreed to discontinue the use of discretionary duties:

▶ In 2001 Kenya eliminated all suspended duties on regional imports and embarked on a comprehensive tariff reform to reduce the top tariff rates from 25% to 40% in preparation of the customs union.

▶ In 2001 Tanzania reduced the number of product categories liable to suspended duties from 17 to 4 products and lowered the maximum suspended duty rate from 50% to 20% on all imports from within the EAC.

▶ Tanzania also simplified its tariff structure from four to three bands as well as lowering the lower band tariff in the 2001/02 budget.

▶ Uganda eliminated a surcharge on alcoholic beverages in March 2001 and removed the special accorded to textiles.

All three countries embarked on trade facilitation efforts leading to the adoption of a common customs management law in 2004.
Intra-EAC Exports

Figure 3: EAC Intra-EAC Exports

- **Total intra-EAC exports, log. scale (left hand axis)**
- **Share of intra-EAC exports to total exports (right hand axis)**

Year


Overview

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Urban Concentration

Figure 4: Primate City Concentration

Overview

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Urban System Effects

Figure 5: Zipf’s Law

*Cities within 90 min. of internal EAC border marked in black
Robustness Test 1

Table 5: Leads and Lags

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Border ( \leq 90) min</td>
<td>-0.040</td>
</tr>
<tr>
<td></td>
<td>(0.019)</td>
</tr>
<tr>
<td>Lead((t-3))</td>
<td>-0.027</td>
</tr>
<tr>
<td></td>
<td>(0.028)</td>
</tr>
<tr>
<td>Lead((t-2))</td>
<td>0.039</td>
</tr>
<tr>
<td></td>
<td>(0.030)</td>
</tr>
<tr>
<td>Lag ((t))</td>
<td>0.071***</td>
</tr>
<tr>
<td></td>
<td>(0.027)</td>
</tr>
<tr>
<td>Lag ((t+1))</td>
<td>0.072***</td>
</tr>
<tr>
<td></td>
<td>(0.022)</td>
</tr>
<tr>
<td>Lag ((t+2))</td>
<td>0.041*</td>
</tr>
<tr>
<td></td>
<td>(0.023)</td>
</tr>
<tr>
<td>Home market access controls</td>
<td>YES</td>
</tr>
<tr>
<td>Country, year FE</td>
<td>YES</td>
</tr>
<tr>
<td>Observations</td>
<td>3,780</td>
</tr>
</tbody>
</table>
## Robustness Test 2

**Table 6: Border Falsification**

<table>
<thead>
<tr>
<th></th>
<th>Value</th>
<th>Standard Error</th>
</tr>
</thead>
<tbody>
<tr>
<td>Border ≤ 90min</td>
<td>0.012</td>
<td>(0.010)</td>
</tr>
<tr>
<td>Border ≤ 90min × EAC 01-04</td>
<td>-0.009</td>
<td>(0.016)</td>
</tr>
<tr>
<td>Border ≤ 90min × EAC 05-09</td>
<td>-0.020</td>
<td>(0.015)</td>
</tr>
<tr>
<td>Border ≤ 90min × EAC 10-13</td>
<td>-0.056***</td>
<td>(0.018)</td>
</tr>
</tbody>
</table>

- Home market access controls: YES
- Country, year, country-year FE: YES
- Observations: 3,780
### Table 7: Levels Specification

<table>
<thead>
<tr>
<th>Specification</th>
<th>Coefficient</th>
<th>Standard Error</th>
</tr>
</thead>
<tbody>
<tr>
<td>Border ≤ 90min</td>
<td>0.169</td>
<td>(0.221)</td>
</tr>
<tr>
<td>Border ≤ 90min × trend</td>
<td>-0.045***</td>
<td>(0.016)</td>
</tr>
<tr>
<td>Border ≤ 90min × EAC 01-04</td>
<td>0.107***</td>
<td>(0.038)</td>
</tr>
<tr>
<td>Border ≤ 90min × EAC 05-09</td>
<td>0.107*</td>
<td>(0.059)</td>
</tr>
<tr>
<td>Border ≤ 90min × EAC 10-13</td>
<td>0.080</td>
<td>(0.076)</td>
</tr>
</tbody>
</table>

- Home market access controls: YES
- Country, year, country-year FE: YES
- Observations: 3,780