Soliciting the "Next Billion" Demands by way of Local Content: Google.co.za in Setswana

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Abstract

Internet connectivity provides enormous improvements in quality of life as well as opportunities, for the newly connected. Attempts to connect the "next billion" in Africa to do meet expectations, even though infrastructure is in place. This paper shows that an exogenous increase in local content creates an enormous incease in demand among native speakers, even when demand as a whole is falling as a result of the economic malaise.

The introduction of the Setswana language in the South African Google Search website was a side of effect of this translation work being done for the Botswanan Google Search website (where Setswana is the official language, together with English) provides and exogenous event which started a huge increase in the number of internet-connected native speakers, as well as actual usage of the Setswana language online.

1 Introduction

Tswana language translation was done for Botswana (www.google.co.bw), so result are not endogeneity.

2 Methods

- Difference in Differences
- no logit because DiD
- should try Imbens etc.

3 Data

- NIDS

4 Results

- Significant only for Setswana and Venda
- Venda not significant for computer
- include hhincome woman best_edu

```
load(file = '../data/results.RData')
```

```
summary(lm4_0)

##
## Call:
## lm(formula = m4_0, data = adulthh)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -0.13357 -0.01363 -0.00520 -0.00345  0.99802
##
## Coefficients: (1 not defined because of singularities)
##                                 Estimate Std. Error t value Pr(>|t|)
## (Intercept)                     0.015337   0.006910   2.219  0.02646 *
## post_eventTRUE                 -0.015337   0.011607  -1.321  0.18638
## factor(a_lng)2                 -0.011977   0.007130  -1.680  0.09298 .
## factor(a_lng)3                 -0.010139   0.007031  -1.442  0.14933
## factor(a_lng)4                 -0.011884   0.007330  -1.621  0.10496
```

```
## factor(a_lng)5                 -0.001710   0.007348  -0.233  0.81596
## factor(a_lng)6                 -0.010081   0.007271  -1.386  0.16560
## factor(a_lng)7                 -0.010693   0.008477  -1.262  0.20712
## factor(a_lng)8                  0.118237   0.010196  11.597  < 2e-16 ***
## factor(a_lng)9                  0.025849   0.008567   3.017  0.00255 **
## factor(a_lng)10                 0.029305   0.007130   4.110 3.96e-05 ***
## factor(a_lng)11                 0.088444   0.007764  11.392  < 2e-16 ***
## factor(a_lng)12                 0.092771   0.021645   4.286 1.82e-05 ***
## post_eventTRUE:factor(a_lng)2   0.013953   0.011955   1.167  0.24318
## post_eventTRUE:factor(a_lng)3   0.014632   0.011794   1.241  0.21476
## post_eventTRUE:factor(a_lng)4   0.016932   0.012224   1.385  0.16603
## post_eventTRUE:factor(a_lng)5   0.013013   0.012301   1.058  0.29010
## post_eventTRUE:factor(a_lng)6   0.020708   0.012188   1.699  0.08932 .
## post_eventTRUE:factor(a_lng)7   0.024171   0.014170   1.706  0.08805 .
## post_eventTRUE:factor(a_lng)8  -0.118237   0.015523  -7.617 2.65e-14 ***
## post_eventTRUE:factor(a_lng)9  -0.023496   0.014036  -1.674  0.09413 .
## post_eventTRUE:factor(a_lng)10  0.010640   0.011962   0.890  0.37372
## post_eventTRUE:factor(a_lng)11  0.013933   0.013255   1.051  0.29321
## post_eventTRUE:factor(a_lng)12        NA         NA      NA       NA
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.1248 on 49276 degrees of freedom
##   (11933 observations deleted due to missingness)
## Multiple R-squared:  0.03597,Adjusted R-squared:  0.03554
## F-statistic: 83.57 on 22 and 49276 DF,  p-value: < 2.2e-16
```

4.1 LM4_1

```
summary(lm4_1)

##
## Call:
## lm(formula = m4_1, data = adulthh)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -0.14231 -0.01879 -0.01159  0.00079  1.01927
##
## Coefficients: (2 not defined because of singularities)
##                                Estimate Std. Error t value Pr(>|t|)
## (Intercept)                   0.0318595  0.0071928   4.429 9.47e-06 ***
## post_eventTRUE                -0.0160615  0.0115788  -1.387  0.16540
## factor(a_lng)2                -0.0099108  0.0073031  -1.357  0.17477
```

```
## factor(a_lng)3                 -0.0074446  0.0072117  -1.032  0.30194
## factor(a_lng)4                 -0.0117912  0.0075144  -1.569  0.11662
## factor(a_lng)5                 -0.0024480  0.0075095  -0.326  0.74444
## factor(a_lng)6                 -0.0090931  0.0074556  -1.220  0.22261
## factor(a_lng)7                 -0.0109606  0.0086869  -1.262  0.20705
## factor(a_lng)8                  0.1112536  0.0102699  10.833  < 2e-16 ***
## factor(a_lng)9                  0.0241967  0.0088206   2.743  0.00609 **
## factor(a_lng)10                 0.0327904  0.0073039   4.489 7.16e-06 ***
## factor(a_lng)11                 0.0832838  0.0079063  10.534  < 2e-16 ***
## factor(a_lng)12                 0.0929623  0.0216230   4.299 1.72e-05 ***
## a_edlitrden                    -0.0033726  0.0022402  -1.505  0.13220
## a_edlitwrten                   -0.0068192  0.0021992  -3.101  0.00193 **
## a_edlitrdhm                     0.0005543  0.0021514   0.258  0.79667
## a_edlitwrthm                    0.0021000  0.0021548   0.975  0.32978
## a_womanTRUE                    -0.0012292  0.0011597  -1.060  0.28918
## post_eventTRUE:factor(a_lng)2   0.0132434  0.0119238   1.111  0.26672
## post_eventTRUE:factor(a_lng)3   0.0145833  0.0117679   1.239  0.21526
## post_eventTRUE:factor(a_lng)4   0.0177728  0.0121993   1.457  0.14516
## post_eventTRUE:factor(a_lng)5   0.0129743  0.0122610   1.058  0.28998
## post_eventTRUE:factor(a_lng)6   0.0200726  0.0121631   1.650  0.09889 .
## post_eventTRUE:factor(a_lng)7   0.0253515  0.0141395   1.793  0.07299 .
## post_eventTRUE:factor(a_lng)8  -0.1117654  0.0154157  -7.250 4.23e-13 ***
## post_eventTRUE:factor(a_lng)9  -0.0181736  0.0140391  -1.294  0.19550
## post_eventTRUE:factor(a_lng)10  0.0095912  0.0119282   0.804  0.42136
## post_eventTRUE:factor(a_lng)11         NA         NA      NA       NA
## post_eventTRUE:factor(a_lng)12         NA         NA      NA       NA
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.1226 on 46438 degrees of freedom
##   (14767 observations deleted due to missingness)
## Multiple R-squared:  0.03921,Adjusted R-squared:  0.03867
## F-statistic: 72.89 on 26 and 46438 DF,  p-value: < 2.2e-16
```

4.2 LM4_5

```
summary(lm4_5)

##
## Call:
## lm(formula = m4_5, data = adulthh)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
```

```
## -1.71081 -0.02109 -0.00980 -0.00074  1.01644
##
## Coefficients:
##                              Estimate Std. Error t value Pr(>|t|)
## (Intercept)                -7.802e-04  1.838e-03  -0.424  0.67127
## post_eventTRUE             -1.186e-02  1.219e-03  -9.728  < 2e-16 ***
## tsongaTRUE                 -1.363e-02  2.430e-03  -5.609 2.04e-08 ***
## factor(a_edlitrden)2        1.540e-03  4.030e-03   0.382  0.70233
## factor(a_edlitrden)3        2.169e-04  5.283e-03   0.041  0.96724
## factor(a_edlitrden)4       -3.700e-03  6.823e-03  -0.542  0.58760
## factor(a_edlitwrten)2      -1.027e-02  4.020e-03  -2.555  0.01064 *
## factor(a_edlitwrten)3      -1.081e-02  5.229e-03  -2.067  0.03874 *
## factor(a_edlitwrten)4      -7.178e-03  6.701e-03  -1.071  0.28407
## factor(a_edlitrdhm)2       -2.615e-03  3.691e-03  -0.709  0.47857
## factor(a_edlitrdhm)3       -2.935e-03  5.139e-03  -0.571  0.56795
## factor(a_edlitrdhm)4       -8.026e-03  6.916e-03  -1.160  0.24587
## factor(a_edlitwrthm)2       8.491e-04  3.729e-03   0.228  0.81990
## factor(a_edlitwrthm)3       1.395e-03  5.147e-03   0.271  0.78640
## factor(a_edlitwrthm)4      -6.975e-03  6.920e-03  -1.008  0.31354
## a_womanTRUE                -1.413e-03  1.147e-03  -1.232  0.21799
## hhincome                    2.753e-06  5.931e-08  46.412  < 2e-16 ***
## best_edu                    1.363e-03  1.165e-04  11.698  < 2e-16 ***
## post_eventTRUE:tsongaTRUE   1.207e-02  3.875e-03   3.114  0.00184 **
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.1211 on 46446 degrees of freedom
##   (14767 observations deleted due to missingness)
## Multiple R-squared:  0.06175,Adjusted R-squared:  0.06139
## F-statistic: 169.8 on 18 and 46446 DF,  p-value: < 2.2e-16
```

4.3 LM2_5

```
summary(lm2_5)

## Error in summary(lm2_5):  object 'lm2_5' not found
```

5 Conclusions and Limitations

- need more local content
- need more research