Making the 'Next Billion' Demand Access

The Effect 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 have not met expectations, even in places where infrastructure has come into place. This paper shows that an exogenous increase in local content creates an enormous increase 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 (Tswana) language in the South-African Google Search website (google.co.za) was a side of effect of this translation work being done for the Botswanan Google Search website (google.co.bw), where Setswana is the official language, together with English. This exogenous event catalysed a huge increase in the number of internet-connected native speakers, as well as actual usage of the Setswana language online.

1 Introduction

- Effect of introduction of Setswana language on Google.co.za on number of native speakers who report paying some non-zero amount on internet in the last 30 days.
- Setswana language translation was done for Botswana (google.co.bw), so result are free of endogeneity issues.
- Setswana is also an official language of South Africa, but only a relatively small percentage of people speak it, there are also Setswana speakers in Zimbabwe and Namibia.
- Data from South Africa on 2008, 2010-2011, and 2012.
- Introduction in Botswana in late 2010, presumably some lag of information on non-internet users.

2 Methods

- Difference in Differences
- No logit because DiD [http://stats.stackexchange.com/questions/89513/difference-in-differences-estimator-for-logistic-regressions].
- Try Imbens etc.

3 Data

- South African National Income Dynamics Survey (Southern Africa Labour and Development Research Unit 2008, 2012, 2013)

4 Results

- Base model's variable of interest (interaction of event dummy and Setswana dummy) finds strong significant result of interaction effect.
- Alternative formulation's variable of interest (interaction of event dummy and factor of categorical language variable) only significant growth only for Setswana and Venda.
- Venda not significant for computer.

Table 1: Base model

```
summary(lm4_0)$coef
```

	Estimate	Std. Error	t value	Pr(>|t|)
(Intercept)	0.0153374	0.0069104	2.2194845	0.0264583
post_eventTRUE	-0.0153374	0.0116070	-1.3213959	0.1863755
factor(a_lng)2	-0.0119771	0.0071295	-1.6799254	0.0929782
factor(a_lng)3	-0.0101387	0.0070313	-1.4419371	0.1493265
factor(a_lng)4	-0.0118839	0.0073298	-1.6212958	0.1049606
factor(a_lng)5	-0.0017102	0.0073480	-0.2327407	0.8159637
factor(a_lng)6	-0.0100812	0.0072710	-1.3864957	0.1656019
factor(a_lng)7	-0.0106935	0.0084765	-1.2615403	0.2071202
factor(a_lng)8	0.1182366	0.0101957	11.5966572	0.0000000
factor(a_lng)9	0.0258487	0.0085674	3.0171200	0.0025532
factor(a_lng)10	0.0293054	0.0071303	4.1099620	0.0000396
factor(a_lng)11	0.0884438	0.0077638	11.3917636	0.0000000
factor(a_lng)12	0.0927707	0.0216448	4.2860579	0.0000182
post_eventTRUE:factor(a_lng)2	0.0139527	0.0119551	1.1670893	0.2431800
post_eventTRUE:factor(a_lng)3	0.0146315	0.0117940	1.2405899	0.2147632
post_eventTRUE:factor(a_lng)4	0.0169315	0.0122240	1.3851020	0.1660275
post_eventTRUE:factor(a_lng)5	0.0130134	0.0123009	1.0579188	0.2900977
post_eventTRUE:factor(a_lng)6	0.0207076	0.0121878	1.6990391	0.0893181
post_eventTRUE:factor(a_lng)7	0.0241705	0.0141697	1.7057877	0.0880539
post_eventTRUE:factor(a_lng)8	-0.1182366	0.0155235	-7.6166264	0.0000000
post_eventTRUE:factor(a_lng)9	-0.0234958	0.0140356	-1.6740145	0.0941341
post_eventTRUE:factor(a_lng)10	0.0106404	0.0119616	0.8895436	0.3737153
post_eventTRUE:factor(a_lng)11	0.0139328	0.0132554	1.0511063	0.2932149

4.1 LM4_1

```
summary(lm4_1)$coef
```

	Estimate	Std. Error	t value	Pr(>|t|)
(Intercept)	0.0318595	0.0071928	4.4293548	0.0000095
post_eventTRUE	-0.0160615	0.0115788	-1.3871439	0.1654045
factor(a_lng)2	-0.0099108	0.0073031	-1.3570604	0.1747686
factor(a_lng)3	-0.0074446	0.0072117	-1.0322986	0.3019376
factor(a_lng)4	-0.0117912	0.0075144	-1.5691408	0.1166220
factor(a_lng)5	-0.0024480	0.0075095	-0.3259828	0.7444388
factor(a_lng)6	-0.0090931	0.0074556	-1.2196300	0.2226114
factor(a_lng)7	-0.0109606	0.0086869	-1.2617360	0.2070501
factor(a_lng)8	0.1112536	0.0102699	10.8329397	0.0000000
factor(a_lng)9	0.0241967	0.0088206	2.7432030	0.0060866
factor(a_lng)10	0.0327904	0.0073039	4.4894292	0.0000072
factor(a_lng)11	0.0832838	0.0079063	10.5339061	0.0000000
factor(a_lng)12	0.0929623	0.0216230	4.2992237	0.0000172
a_edlitrden	-0.0033726	0.0022402	-1.5054902	0.1322049
a_edlitwrten	-0.0068192	0.0021992	-3.1007081	0.0019317
a_edlitrdhm	0.0005543	0.0021514	0.2576646	0.7966669
a_edlitwrthm	0.0021000	0.0021548	0.9745694	0.3297790
a_womanTRUE	-0.0012292	0.0011597	-1.0599272	0.2891832
post_eventTRUE:factor(a_lng)2	0.0132434	0.0119238	1.1106677	0.2667171
post_eventTRUE:factor(a_lng)3	0.0145833	0.0117679	1.2392479	0.2152600
post_eventTRUE:factor(a_lng)4	0.0177728	0.0121993	1.4568644	0.1451606
post_eventTRUE:factor(a_lng)5	0.0129743	0.0122610	1.0581779	0.2899798
post_eventTRUE:factor(a_lng)6	0.0200726	0.0121631	1.6502852	0.0988914
post_eventTRUE:factor(a_lng)7	0.0253515	0.0141395	1.7929538	0.0729868
post_eventTRUE:factor(a_lng)8	-0.1117654	0.0154157	-7.2500872	0.0000000
post_eventTRUE:factor(a_lng)9	-0.0181736	0.0140391	-1.2944988	0.1954996
post_eventTRUE:factor(a_lng)10	0.0095912	0.0119282	0.8040750	0.4213578

4.2 LM4_5

```
summary(lm4_5)$coef
```

	Estimate	Std. Error	t value	Pr(>|t|)
(Intercept)	-0.0007802	0.0018382	-0.4244139	0.6712660
post_eventTRUE	-0.0118598	0.0012192	-9.7275870	0.0000000
setswanaTRUE	-0.0136327	0.0024304	-5.6091357	0.0000000
factor(a_edlitrden)2	0.0015400	0.0040296	0.3821762	0.7023324
factor(a_edlitrden)3	0.0002169	0.0052826	0.0410653	0.9672440
factor(a_edlitrden)4	-0.0037000	0.0068226	-0.5423219	0.5875994
factor(a_edlitwrten)2	-0.0102695	0.0040201	-2.5545159	0.0106367
factor(a_edlitwrten)3	-0.0108074	0.0052286	-2.0669776	0.0387418
factor(a_edlitwrten)4	-0.0071782	0.0067009	-1.0712332	0.2840702
factor(a_edlitrdhm)2	-0.0026154	0.0036909	-0.7086027	0.4785746
factor(a_edlitrdhm)3	-0.0029346	0.0051387	-0.5710741	0.5679522
factor(a_edlitrdhm)4	-0.0080255	0.0069159	-1.1604527	0.2458705
factor(a_edlitwrthm)2	0.0008491	0.0037294	0.2276776	0.8198979
factor(a_edlitwrthm)3	0.0013947	0.0051466	0.2709891	0.7864006
factor(a_edlitwrthm)4	-0.0069746	0.0069204	-1.0078396	0.3135367
a_womanTRUE	-0.0014132	0.0011472	-1.2318972	0.2179937
hhincome	0.0000028	0.0000001	46.4115514	0.0000000
best_edu	0.0013633	0.0001165	11.6980667	0.0000000
post_eventTRUE:setswanaTRUE	0.0120675	0.0038748	3.1143779	0.0018445

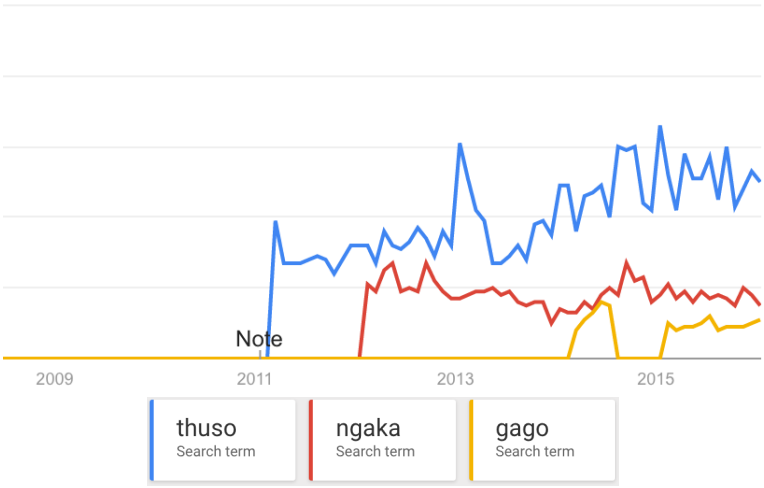
4.3 LM2_5

```
summary(lm2_5)$coef
```

	Estimate	Std. Error	t value	Pr(>|t|)
(Intercept)	0.0076236	0.0031357	2.4312519	0.0150504
post_eventTRUE	-0.0054318	0.0020923	-2.5960394	0.0094334
setswanaTRUE	-0.0147962	0.0041674	-3.5504730	0.0003849
factor(a_edlitrden)2	-0.0306508	0.0069013	-4.4412904	0.0000090
factor(a_edlitrden)3	-0.0309578	0.0090312	-3.4278696	0.0006089
factor(a_edlitrden)4	-0.0389988	0.0116608	-3.3444228	0.0008252
factor(a_edlitwrten)2	-0.0174611	0.0068860	-2.5357494	0.0112239
factor(a_edlitwrten)3	-0.0210480	0.0089368	-2.3552002	0.0185168
factor(a_edlitwrten)4	-0.0187070	0.0114489	-1.6339589	0.1022741
factor(a_edlitrdhm)2	-0.0018694	0.0063225	-0.2956791	0.7674765
factor(a_edlitrdhm)3	-0.0042389	0.0088029	-0.4815352	0.6301384
factor(a_edlitrdhm)4	-0.0267295	0.0118766	-2.2506064	0.0244150
factor(a_edlitwrthm)2	0.0012267	0.0063829	0.1921868	0.8475967
factor(a_edlitwrthm)3	-0.0019980	0.0088200	-0.2265280	0.8207918
factor(a_edlitwrthm)4	-0.0357502	0.0118852	-3.0079574	0.0026315
a_womanTRUE	-0.0229898	0.0019601	-11.7288993	0.0000000
hhincome	0.0000058	0.0000001	56.9305683	0.0000000
best_edu	0.0058348	0.0002002	29.1431892	0.0000000
post_eventTRUE:setswanaTRUE	0.0238541	0.0066835	3.5690970	0.0003586

4.4 Other results

Figure 1: Usage of Setswana Words on Google.co.za



5 Conclusions and Limitations

- need more local content
- need more research

References

Southern Africa Labour and Development Research Unit

2008 *National Income Dynamics Study, Wave 1*, version 5.3, `http://www.nids.uct.ac.za/home/`.

2012 *National Income Dynamics Study, Wave 2*, version 2.3, `http://www.nids.uct.ac.za/home/`.

2013 *National Income Dynamics Study, Wave 3*, version 1.3, `http://www.nids.uct.ac.za/home/`.