**Spread-ing uncertainty, shrinking birth rates:**

**A natural experiment for Italy**

**Chiara L. Comolli\***

Institute of Social Sciences and Life Course and Social Inequality Research Center University of Lausanne

Geopolis, Quartier Mouline, Lausanne (CH)

chiara.comolli@unil.ch

**Daniele Vignoli**

University of Florence

Viale GB. Morgagni 59, 50134, Florence (IT)

daniele.vignoli@unifi.it

\*Corresponding author

**Online supplementary material**

**Appendix A**

**Table A.1: Summary statistics**

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **BEFORE November 2011** | | | | |  | **AFTER November 2011** | | | | |
| **NATIONAL ESTIMATES** | **N** | **Mean** | **Std. Dev.** | **Min** | **Max** |  | **N** | **Mean** | **Std. Dev.** | **Min** | **Max** |
| Birth rate\*1000 | 76 | 4.07 | 0.289 | 3.33 | 4.70 |  | 77 | 3.75 | 0.32 | 2.98 | 4.61 |
| Marriage rate\*1000 | 76 | 341.76 | 219.07 | 59.94 | 793.54 |  | 77 | 260.51 | 187.10 | 61.94 | 666.16 |
| Google Trends (GT) | 76 | 4.17 | 2.01 | 2 | 16 |  | 77 | 19.82 | 13.61 | 7 | 100 |
| Spread | 76 | 0.90 | 0.80 | 0.20 | 3.97 |  | 77 | 2.20 | 1.09 | 1.03 | 5.19 |
| Unemployment rate | 76 | 7.42 | 0.85 | 5.93 | 8.90 |  | 77 | 11.81 | 0.81 | 9.34 | 13.29 |
| Consumer confidence (2010=100) | 76 | 98.88 | 3.69 | 90.3 | 105.5 |  | 77 | 101.62 | 11.29 | 82.2 | 118.3 |
|  | **BEFORE November 2011** | | | | |  | **AFTER November 2011** | | | | |
| **REGIONAL ESTIMATES** | **N** | **Mean** | **Std. Dev.** | **Min** | **Max** |  | **N** | **Mean** | **Std. Dev.** | **Min** | **Max** |
| Birth rate\*1000 | 1292 | 4.01 | 0.44 | 2.65 | 6.09 |  | 1309 | 3.71 | 0.45 | 2.42 | 5.35 |
| Google Trends (GT) | 790 | 10.07 | 9.07 | 1 | 68 |  | 1308 | 20.71 | 14.66 | 2 | 100 |
| Unemployment rate | 1292 | 7.46 | 3.78 | 2.04 | 16.65 |  | 1309 | 12.11 | 5.55 | 3.59 | 25.15 |
| Access | 1292 | 43.65 | 8.64 | 23.50 | 60.7 |  | 1309 | 64.46 | 7.25 | 44.2 | 80.9 |
| Age structure | 1292 | 70.77 | 8.63 | 54.62 | 87.81 |  | 1258 | 72.89 | 7.84 | 58.54 | 87.46 |

Source: Istat, Eurostat, OECD, and Google data (2020).

**Table A.2: GT spread peak effect on birth rates. National-level LLR estimates**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | (1) | (2) | (3) | (4) |
|  | Whole sample | Symmetric 3 years | Symmetric 2 years | Symmetric 1 year |
| GT spread peak | -0.152\*\*\* | -0.083\*\* | -0.106\*\* | -0.106 |
|  | (-0.235 - -0.070) | (-0.147 - -0.018) | (-0.197 - -0.015) | (-0.314 - 0.102) |
| Date (mean cent.) | 0.000 | -0.002\*\* | -0.004 | 0.004 |
|  | (-0.001 - 0.002) | (-0.004 - -0.000) | (-0.010 - 0.002) | (-0.019 - 0.027) |
| GT spread peak\*Date | -0.006\*\*\* | -0.005\*\* | -0.001 | -0.007 |
|  | (-0.008 - -0.003) | (-0.009 - -0.001) | (-0.012 - 0.010) | (-0.047 - 0.033) |
| Spread | 0.000 | 0.001 | 0.018 | -0.005 |
|  | (-0.025 - 0.025) | (-0.026 - 0.029) | (-0.035 - 0.070) | (-0.120 - 0.111) |
| Constant | 4.092\*\*\* | 4.040\*\*\* | 3.984\*\*\* | 4.077\*\*\* |
|  | (4.021 - 4.163) | (3.973 - 4.107) | (3.827 - 4.142) | (3.666 - 4.488) |
| N | 153 | 72 | 48 | 24 |
| R-squared | 0.930 | 0.912 | 0.846 | 0.705 |
| BIC | -439.33 | -237.99 | -155.71 | -86.83 |

Source: Istat, OECD and Google data (2020). Note: Whole sample covers births in April 2006-December 2018; Symmetric 3 years sample covers births in August 2009-August 2015; Symmetric 2 years sample covers births in August 2010 -August 2014; Symmetric 1 year sample covers births in August 2011-August 2013. Symmetric 6 and 3 months not reported because of very small sample size (N=12 and N=6, respectively). Standard errors clustered by years. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

**Table A.3: GT spread peak effect on birth rates. Regional-level fixed effects LLR estimates**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | (1) | (2) | (3) | (4) | (5) | (6) |
|  | Whole sample | Symmetric 3 years | Symmetric 2 years | Symmetric 1 year | Symmetric 6 months | Symmetric 3 months |
| GT spread peak | -0.131\*\*\* | -0.079\*\*\* | -0.106\*\*\* | -0.107\*\*\* | -0.048\*\*\* | -0.057\*\*\* |
|  | (-0.158 - -0.104) | (-0.095 - -0.062) | (-0.122 - -0.091) | (-0.116 - -0.098) | (-0.062 - -0.035) | (-0.091 - -0.022) |
| Date (mean cent.) | 0.001 | -0.001\* | -0.004\*\*\* | 0.004\*\*\* | -0.006 | -0.002 |
|  | (-0.000 - 0.002) | (-0.003 - 0.000) | (-0.005 - -0.002) | (0.002 - 0.007) | (-0.015 - 0.002) | (-0.022 - 0.018) |
| GT spread peak\*Date | -0.006\*\*\* | -0.005\*\*\* | -0.001 | -0.007\*\*\* | -0.006 | -0.038\*\* |
|  | (-0.008 - -0.004) | (-0.008 - -0.003) | (-0.004 - 0.003) | (-0.010 - -0.003) | (-0.021 - 0.009) | (-0.073 - -0.004) |
| Spread | -0.003 | -0.000 | 0.018\*\*\* | -0.004 | -0.013\* | 0.006 |
|  | (-0.014 - 0.007) | (-0.007 - 0.006) | (0.012 - 0.024) | (-0.009 - 0.002) | (-0.026 - 0.001) | (-0.028 - 0.041) |
| Constant | 4.043\*\*\* | 3.997\*\*\* | 3.936\*\*\* | 4.027\*\*\* | 4.018\*\*\* | 3.952\*\*\* |
|  | (3.994 - 4.092) | (3.970 - 4.024) | (3.906 - 3.966) | (4.000 - 4.053) | (3.953 - 4.083) | (3.793 - 4.112) |
| N | 2,601 | 1,224 | 816 | 408 | 204 | 102 |
| R-squared | 0.765 | 0.738 | 0.681 | 0.555 | 0.767 | 0.816 |
| N Regions | 17 | 17 | 17 | 17 | 17 | 17 |
| BIC | -4517.05 | -2996.72 | -2246.30 | -1339.11 | -773.94 | -446.95 |

Source: Istat, OECD and Google data (2020). Note: Whole sample covers births in April 2006-December 2018; Symmetric 3 years sample covers births in August 2009-August 2015; Symmetric 2 years sample covers births in August 2010-August 2014; Symmetric 1 year sample covers births in August 2011-August 2013; Symmetric 6 months sample covers births in February 2012-February 2013; Symmetric 3 months sample covers births in May 2012-Novermber 2012. Robust standard errors. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

**Table A.4: GT spread peak effect on birth rates. National-level Global Polynomial estimates**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Model | Model | Model | Model | Model | Model | Model | Model |
|  | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| GT spread peak | -0.152\*\*\* | -0.121\*\*\* | -0.077\*\*\* | -0.095\*\*\* | -0.077\*\*\* | -0.105\*\*\* | -0.096\*\*\* | -0.106\*\* |
|  | (-0.235 - -0.070) | (-0.198 - -0.045) | (-0.132 - -0.023) | (-0.142 - -0.048) | (-0.115 - -0.039) | (-0.172 - -0.039) | (-0.162 - -0.030) | (-0.209 - -0.002) |
| Date (mean cent.) | 0.000 | -0.008\*\*\* | -0.005 | -0.003 | -0.019 | 0.001 | -0.010 | -0.001 |
|  | (-0.001 - 0.002) | (-0.012 - -0.005) | (-0.011 - 0.002) | (-0.015 - 0.010) | (-0.043 - 0.005) | (-0.025 - 0.027) | (-0.047 - 0.026) | (-0.033 - 0.030) |
| Date squared |  | -0.000\*\*\* | -0.000 | 0.000 | -0.001 | 0.001 | -0.001 | 0.001 |
|  |  | (-0.000 - -0.000) | (-0.000 - 0.000) | (-0.001 - 0.001) | (-0.003 - 0.000) | (-0.002 - 0.004) | (-0.006 - 0.004) | (-0.003 - 0.005) |
| Date cubic |  |  | 0.000 | 0.000 | -0.000 | 0.000 | -0.000 | 0.000 |
|  |  |  | (-0.000 - 0.000) | (-0.000 - 0.000) | (-0.000 - 0.000) | (-0.000 - 0.000) | (-0.000 - 0.000) | (-0.000 - 0.000) |
| Date order 4 |  |  |  | 0.000 | -0.000 | 0.000 | -0.000 | 0.000 |
|  |  |  |  | (-0.000 - 0.000) | (-0.000 - 0.000) | (-0.000 - 0.000) | (-0.000 - 0.000) | (-0.000 - 0.000) |
| Date order 5 |  |  |  |  | -0.000 | 0.000 | -0.000 | 0.000 |
|  |  |  |  |  | (-0.000 - 0.000) | (-0.000 - 0.000) | (-0.000 - 0.000) | (-0.000 - 0.000) |
| Date order 6 |  |  |  |  |  | 0.000\* | -0.000 | -0.000\* |
|  |  |  |  |  |  | (-0.000 - 0.000) | (-0.000 - 0.000) | (-0.000 - 0.000) |
| Date order 7 |  |  |  |  |  |  | -0.000 | -0.000 |
|  |  |  |  |  |  |  | (-0.000 - 0.000) | (-0.000 - 0.000) |
| Date order 8 |  |  |  |  |  |  |  | 0.000 |
|  |  |  |  |  |  |  |  | (-0.000 - 0.000) |
| GT spread peak\*Date | -0.006\*\*\* | 0.006 | -0.006 | 0.003 | 0.023 | -0.004 | 0.015 | 0.001 |
|  | (-0.008 - -0.003) | (-0.003 - 0.014) | (-0.018 - 0.006) | (-0.014 - 0.019) | (-0.012 - 0.057) | (-0.042 - 0.033) | (-0.043 - 0.073) | (-0.031 - 0.033) |
| GT spread peak\*Date squared |  | 0.000\*\*\* | 0.000\*\* | -0.001\* | 0.000 | -0.001 | -0.001 | -0.001 |
|  |  | (0.000 - 0.000) | (0.000 - 0.000) | (-0.001 - 0.000) | (-0.001 - 0.002) | (-0.005 - 0.003) | (-0.004 - 0.002) | (-0.009 - 0.006) |
| GT spread peak\*Date cubic |  |  | -0.000\*\* | 0.000\*\* | 0.000\* | -0.000 | 0.000 | -0.000 |
|  |  |  | (-0.000 - -0.000) | (0.000 - 0.000) | (-0.000 - 0.000) | (-0.000 - 0.000) | (-0.000 - 0.001) | (-0.000 - 0.000) |
| GT spread peak\*Date order 4 |  |  |  | -0.000\*\* | 0.000 | -0.000 | -0.000 | -0.000 |
|  |  |  |  | (-0.000 - -0.000) | (-0.000 - 0.000) | (-0.000 - 0.000) | (-0.000 - 0.000) | (-0.000 - 0.000) |
| GT spread peak\*Date order 5 |  |  |  |  | 0.000 | -0.000 | 0.000 | - |
|  |  |  |  |  | (-0.000 - 0.000) | (-0.000 - 0.000) | (-0.000 - 0.000) |  |
| GT spread peak\*Date order 6 |  |  |  |  |  | -0.000 | - | - |
|  |  |  |  |  |  | (-0.000 - 0.000) |  |  |
| GT spread peak\*Date order 7 |  |  |  |  |  |  | 0.000 | - |
|  |  |  |  |  |  |  | (-0.000 - 0.000) |  |
| GT spread peak\*Date order 8 |  |  |  |  |  |  |  | 0.000 |
|  |  |  |  |  |  |  |  | (-0.000 - 0.000) |
| Spread | 0.000 | 0.028\* | 0.019 | 0.005 | 0.017 | 0.015 | 0.015 | 0.015 |
|  | (-0.025 - 0.025) | (-0.003 - 0.059) | (-0.015 - 0.054) | (-0.029 - 0.039) | (-0.019 - 0.053) | (-0.023 - 0.053) | (-0.023 - 0.053) | (-0.023 - 0.052) |
| Constant | 4.092\*\*\* | 3.934\*\*\* | 3.975\*\*\* | 4.021\*\*\* | 3.941\*\*\* | 3.989\*\*\* | 3.970\*\*\* | 3.987\*\*\* |
|  | (4.021 - 4.163) | (3.842 - 4.026) | (3.864 - 4.087) | (3.885 - 4.157) | (3.770 - 4.111) | (3.827 - 4.150) | (3.798 - 4.142) | (3.830 - 4.143) |
| N | 153 | 153 | 153 | 153 | 153 | 153 | 153 | 153 |
| R-squared | 0.930 | 0.948 | 0.952 | 0.956 | 0.956 | 0.957 | 0.958 | 0.958 |
| BIC | -439.33 | -475.55 | -478.41 | -489.39 | -482.33 | -486.02 | -486.94 | -486.57 |

Source: Istat and Google data (2020). Note: all models include on the whole sample (births in April 2006-December 2018). In Models 7-8 blank estimates are omitted for collinearity. Standard errors clustered by years. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

**Table A.5: GT spread peak effect on birth rates. Regional-level fixed effect Global Polynomial estimates**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Model | Model | Model | Model | Model | Model | Model | Model |
|  | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| GT spread peak | -0.131\*\*\* | -0.110\*\*\* | -0.076\*\*\* | -0.089\*\*\* | -0.074\*\*\* | -0.117\*\*\* | -0.107\*\*\* | -0.110\*\*\* |
|  | (-0.158 - -0.104) | (-0.131 - -0.090) | (-0.097 - -0.056) | (-0.113 - -0.064) | (-0.091 - -0.056) | (-0.137 - -0.097) | (-0.125 - -0.088) | (-0.131 - -0.089) |
| Date (mean cent.) | 0.001 | -0.007\*\*\* | -0.002 | -0.002 | -0.019\*\*\* | 0.009 | -0.002 | 0.003 |
|  | (-0.000 - 0.002) | (-0.009 - -0.005) | (-0.007 - 0.002) | (-0.009 - 0.004) | (-0.025 - -0.012) | (-0.005 - 0.023) | (-0.016 - 0.011) | (-0.012 - 0.019) |
| Date squared |  | -0.000\*\*\* | 0.000 | -0.000 | -0.001\*\*\* | 0.002\*\* | 0.000 | 0.001 |
|  |  | (-0.000 - -0.000) | (-0.000 - 0.000) | (-0.000 - 0.000) | (-0.002 - -0.001) | (0.000 - 0.004) | (-0.002 - 0.002) | (-0.001 - 0.003) |
| Date cubic |  |  | 0.000\*\* | -0.000 | -0.000\*\*\* | 0.000\*\*\* | -0.000 | 0.000 |
|  |  |  | (0.000 - 0.000) | (-0.000 - 0.000) | (-0.000 - -0.000) | (0.000 - 0.000) | (-0.000 - 0.000) | (-0.000 - 0.000) |
| Date order 4 |  |  |  | -0.000 | -0.000\*\*\* | 0.000\*\*\* | -0.000 | 0.000 |
|  |  |  |  | (-0.000 - 0.000) | (-0.000 - -0.000) | (0.000 - 0.000) | (-0.000 - 0.000) | (-0.000 - 0.000) |
| Date order 5 |  |  |  |  | -0.000\*\*\* | 0.000\*\*\* | -0.000 | 0.000 |
|  |  |  |  |  | (-0.000 - -0.000) | (0.000 - 0.000) | (-0.000 - 0.000) | (-0.000 - 0.000) |
| Date order 6 |  |  |  |  |  | 0.000\*\*\* | -0.000\*\* | -0.000\*\*\* |
|  |  |  |  |  |  | (0.000 - 0.000) | (-0.000 - -0.000) | (-0.000 - -0.000) |
| Date order 7 |  |  |  |  |  |  | -0.000\*\*\* | -0.000 |
|  |  |  |  |  |  |  | (-0.000 - -0.000) | (-0.000 - 0.000) |
| Date order 8 |  |  |  |  |  |  |  | 0.000 |
|  |  |  |  |  |  |  |  | (-0.000 - 0.000) |
| GT spread peak\*Date | -0.006\*\*\* | 0.005\*\*\* | -0.008\*\* | 0.002 | 0.023\*\*\* | -0.012 | 0.007 | -0.004 |
|  | (-0.008 - -0.004) | (0.002 - 0.008) | (-0.016 - -0.000) | (-0.007 - 0.011) | (0.014 - 0.032) | (-0.027 - 0.004) | (-0.010 - 0.025) | (-0.017 - 0.010) |
| GT spread peak\*Date squared |  | 0.000\*\*\* | 0.000\*\* | -0.000\*\* | 0.000 | -0.002\*\* | -0.001\* | -0.001 |
|  |  | (0.000 - 0.000) | (0.000 - 0.000) | (-0.001 - -0.000) | (-0.000 - 0.001) | (-0.004 - -0.000) | (-0.003 - 0.000) | (-0.004 - 0.001) |
| GT spread peak\*Date cubic |  |  | -0.000\*\*\* | 0.000\*\*\* | 0.000\*\*\* | -0.000\*\*\* | 0.000 | -0.000\*\* |
|  |  |  | (-0.000 - -0.000) | (0.000 - 0.000) | (0.000 - 0.000) | (-0.000 - -0.000) | (-0.000 - 0.000) | (-0.000 - -0.000) |
| GT spread peak\*Date order 4 |  |  |  | -0.000\*\*\* | 0.000 | -0.000\*\* | -0.000\* | -0.000 |
|  |  |  |  | (-0.000 - -0.000) | (-0.000 - 0.000) | (-0.000 - -0.000) | (-0.000 - 0.000) | (-0.000 - 0.000) |
| GT spread peak\*Date order 5 |  |  |  |  | 0.000\*\*\* | -0.000\*\*\* | 0.000\* | - |
|  |  |  |  |  | (0.000 - 0.000) | (-0.000 - -0.000) | (-0.000 - 0.000) |  |
| GT spread peak\*Date order 6 |  |  |  |  |  | -0.000\*\* | - | - |
|  |  |  |  |  |  | (-0.000 - -0.000) |  |  |
| GT spread peak\*Date order 7 |  |  |  |  |  |  | 0.000\*\*\* | - |
|  |  |  |  |  |  |  | (0.000 - 0.000) |  |
| GT spread peak\*Date order 8 |  |  |  |  |  |  |  | -0.000 |
|  |  |  |  |  |  |  |  | (-0.000 - 0.000) |
| Spread | -0.003 | 0.023\*\*\* | 0.013\*\* | 0.002 | 0.014\*\*\* | 0.012\*\*\* | 0.012\*\*\* | 0.012\*\*\* |
|  | (-0.014 - 0.007) | (0.015 - 0.031) | (0.003 - 0.023) | (-0.007 - 0.011) | (0.008 - 0.021) | (0.005 - 0.019) | (0.005 - 0.019) | (0.004 - 0.019) |
| Constant | 4.043\*\*\* | 3.899\*\*\* | 3.954\*\*\* | 3.980\*\*\* | 3.900\*\*\* | 3.966\*\*\* | 3.947\*\*\* | 3.957\*\*\* |
|  | (3.994 - 4.092) | (3.862 - 3.936) | (3.893 - 4.015) | (3.910 - 4.050) | (3.853 - 3.948) | (3.906 - 4.025) | (3.884 - 4.009) | (3.895 - 4.020) |
| N | 2,601 | 2,601 | 2,601 | 2,601 | 2,601 | 2,601 | 2,601 | 2,601 |
| R-squared | 0.765 | 0.778 | 0.782 | 0.784 | 0.785 | 0.787 | 0.787 | 0.787 |
| N regions | 17 | 17 | 17 | 17 | 17 | 17 | 17 | 17 |
| BIC | -4517.05 | -4651.32 | -4680.98 | -4704.66 | -4698.78 | -4719.21 | -4722.08 | -4721.16 |

Source: Istat and Google data (2020). Note: all models include on the whole sample (births in April 2006-December 2018). In Models 7-8 blank estimates are omitted for collinearity. Robust standard errors. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

**Appendix B: Robustness checks**

**Alternative smoothing of birth rates**

Tables B.1-2 show the estimates obtained using the program X12-ARIMA, a seasonal adjustment program developed by the US Census Bureau, to smooth the birth rate time series. Results are qualitatively similar to ours using the moving average, although confidence intervals become larger. While regional estimates remain negative and significant in all models, in the national sample LLR with small bandwidths and global polynomial estimates become statistically insignificant.

**Table B.1: GT spread peak effect on birth rates. National-level LLR and Global Polynomial estimates**

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **(a)**  **LLR** | | | | | | | | | | | |
|  | | Whole sample | | | Symmetric 3 years | | Symmetric 2 years | | | Symmetric 1 year | |
|  | | (1) | | | (2) | | (3) | | | (4) | |
| GT spread peak | | -0.124\*\* | | | -0.024 | | -0.035 | | | -0.059 | |
|  | | (-0.238 - -0.009) | | | (-0.078 - 0.030) | | (-0.095 - 0.026) | | | (-0.219 - 0.102) | |
| Date (mean cent.) | | -0.001 | | | -0.004\*\*\* | | -0.005\*\* | | | -0.002 | |
|  | | (-0.003 - 0.002) | | | (-0.005 - -0.002) | | (-0.009 - -0.002) | | | (-0.012 - 0.007) | |
| GT spread peak\*Date | | -0.005\*\*\* | | | -0.003\*\* | | 0.000 | | | -0.002 | |
|  | | (-0.008 - -0.002) | | | (-0.006 - -0.000) | | (-0.006 - 0.007) | | | (-0.025 - 0.021) | |
| Spread | | -0.007 | | | -0.012\* | | -0.006 | | | -0.008 | |
|  | | (-0.046 - 0.031) | | | (-0.026 - 0.001) | | (-0.021 - 0.009) | | | (-0.045 - 0.029) | |
| Constant | | 4.077\*\*\* | | | 4.020\*\*\* | | 3.991\*\*\* | | | 4.016\*\*\* | |
|  | | (3.980 - 4.174) | | | (3.988 - 4.052) | | (3.920 - 4.062) | | | (3.883 - 4.150) | |
| N | | 153 | | | 72 | | 48 | | | 24 | |
| R-squared | | 0.942 | | | 0.977 | | 0.963 | | | 0.943 | |
| BIC | | -457.33 | | | -346.84 | | -234.04 | | | -129.06 | |
| **(b)**  **Global Polynomial** | | | | | | | | | | | |
|  | Model | | Model | Model | | Model | | Model | Model | | Model |
|  | (1) | | (2) | (3) | | (4) | | (5) | (6) | | (7) |
| GT spread peak | -0.030 | | -0.044 | -0.079\* | | -0.034 | | -0.034 | -0.031 | | -0.041 |
|  | (-0.100 - 0.039) | | (-0.112 - 0.023) | (-0.172 - 0.014) | | (-0.096 - 0.029) | | (-0.101 - 0.032) | (-0.103 - 0.040) | | (-0.127 - 0.045) |
| Date (mean cent.) | -0.011\*\*\* | | -0.004 | 0.004 | | -0.012 | | 0.015 | 0.010 | | 0.011 |
|  | (-0.014 - -0.007) | | (-0.013 - 0.005) | (-0.012 - 0.019) | | (-0.033 - 0.010) | | (-0.020 - 0.051) | (-0.033 - 0.054) | | (-0.032 - 0.054) |
| Date squared | -0.000\*\*\* | | 0.000 | 0.000 | | -0.001 | | 0.002 | 0.002 | | 0.002 |
|  | (-0.000 - -0.000) | | (-0.000 - 0.000) | (-0.000 - 0.001) | | (-0.003 - 0.001) | | (-0.001 - 0.006) | (-0.004 - 0.007) | | (-0.003 - 0.007) |
| Date cubic |  | | 0.000 | 0.000 | | -0.000 | | 0.000 | 0.000 | | 0.000 |
|  |  | | (-0.000 - 0.000) | (-0.000 - 0.000) | | (-0.000 - 0.000) | | (-0.000 - 0.000) | (-0.000 - 0.000) | | (-0.000 - 0.000) |
| Date order 4 |  | |  | 0.000 | | -0.000 | | 0.000 | 0.000 | | 0.000 |
|  |  | |  | (-0.000 - 0.000) | | (-0.000 - 0.000) | | (-0.000 - 0.000) | (-0.000 - 0.000) | | (-0.000 - 0.000) |
| Date order 5 |  | |  |  | | -0.000 | | 0.000\* | 0.000 | | 0.000 |
|  |  | |  |  | | (-0.000 - 0.000) | | (-0.000 - 0.000) | (-0.000 - 0.000) | | (-0.000 - 0.000) |
| Date order 6 |  | |  |  | |  | | 0.000\* | -0.000 | | -0.000\*\*\* |
|  |  | |  |  | |  | | (-0.000 - 0.000) | (-0.000 - 0.000) | | (-0.000 - -0.000) |
| Date order 7 |  | |  |  | |  | |  | -0.000 | | -0.000 |
|  |  | |  |  | |  | |  | (-0.000 - 0.000) | | (-0.000 - 0.000) |
| Date order 8 |  | |  |  | |  | |  |  | | -0.000 |
|  |  | |  |  | |  | |  |  | | (-0.000 - 0.000) |
| GT spread peak\*Date | 0.005\* | | -0.003 | 0.005 | | 0.014 | | -0.046\* | -0.036 | | -0.029 |
|  | (-0.001 - 0.012) | | (-0.018 - 0.012) | (-0.017 - 0.027) | | (-0.018 - 0.046) | | (-0.092 - 0.000) | (-0.096 - 0.024) | | (-0.069 - 0.011) |
| GT spread peak\*Date squared | 0.000\*\*\* | | -0.000 | -0.001\*\* | | 0.000 | | 0.002 | 0.002 | | 0.000 |
|  | (0.000 - 0.000) | | (-0.000 - 0.000) | (-0.003 - -0.000) | | (-0.002 - 0.003) | | (-0.003 - 0.006) | (-0.003 - 0.006) | | (-0.008 - 0.009) |
| GT spread peak\*Date cubic |  | | -0.000 | 0.000 | | 0.000 | | -0.000\*\*\* | -0.000 | | -0.000\*\* |
|  |  | | (-0.000 - 0.000) | (-0.000 - 0.000) | | (-0.000 - 0.000) | | (-0.001 - -0.000) | (-0.001 - 0.000) | | (-0.000 - -0.000) |
| GT spread peak\*Date order 4 |  | |  | -0.000\*\* | | 0.000 | | 0.000 | 0.000 | | -0.000 |
|  |  | |  | (-0.000 - -0.000) | | (-0.000 - 0.000) | | (-0.000 - 0.000) | (-0.000 - 0.000) | | (-0.000 - 0.000) |
| GT spread peak\*Date order 5 |  | |  |  | | 0.000 | | -0.000\*\*\* | -0.000 | |  |
|  |  | |  |  | | (-0.000 - 0.000) | | (-0.000 - -0.000) | (-0.000 - 0.000) | |  |
| GT spread peak\*Date order 6 |  | |  |  | |  | | 0.000 |  | |  |
|  |  | |  |  | |  | | (-0.000 - 0.000) |  | |  |
| GT spread peak\*Date order 7 |  | |  |  | |  | |  | 0.000 | |  |
|  |  | |  |  | |  | |  | (-0.000 - 0.000) | |  |
| GT spread peak\*Date order 8 |  | |  |  | |  | |  |  | | 0.000 |
|  |  | |  |  | |  | |  |  | | (-0.000 - 0.000) |
| Spread | 0.013 | | 0.005 | -0.022 | | -0.014 | | -0.018 | -0.018 | | -0.018 |
|  | (-0.008 - 0.033) | | (-0.024 - 0.034) | (-0.050 - 0.006) | | (-0.039 - 0.010) | | (-0.047 - 0.011) | (-0.046 - 0.011) | | (-0.047 - 0.011) |
| Constant | 3.914\*\*\* | | 3.972\*\*\* | 4.071\*\*\* | | 4.006\*\*\* | | 4.074\*\*\* | 4.065\*\*\* | | 4.067\*\*\* |
|  | (3.838 - 3.989) | | (3.865 - 4.079) | (3.942 - 4.200) | | (3.896 - 4.116) | | (3.925 - 4.223) | (3.910 - 4.220) | | (3.904 - 4.229) |
| N | 153 | | 153 | 153 | | 153 | | 153 | 153 | | 153 |
| R-squared | 0.971 | | 0.972 | 0.980 | | 0.981 | | 0.986 | 0.986 | | 0.986 |
| BIC | -551.77 | | -551.51 | -593.79 | | -598.47 | | -649.69 | -645.64 | | -650.24 |

Source: Istat and Google data (2020). Note: Whole sample covers births in April 2006-December 2018; Symmetric 3 years sample covers births in August 2009-August 2015; Symmetric 2 years sample covers births in August 2010-August 2014; Symmetric 1 year sample covers births in August 2011-August 2013; Symmetric 6 months sample covers births in February 2012-February 2013; Symmetric 3 months sample covers births in May 2012-Novermber 2012. Global Polynomial models are run on the whole sample. Blank estimates are omitted for collinearity. Standard errors clustered by years. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

**Table B.2: GT spread peak effect on birth rates. Regional-level LLR and Global Polynomial estimates**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **(a)**  **LLR** | | | | | | | | | | | | | |
|  | | Whole  sample | | Symmetric  3 years | | Symmetric  2 years | | Symmetric  1 year | | Symmetric  6 months | | Symmetric  3 months | |
|  | | (1) | | (2) | | (3) | | (4) | | (5) | | (6) | |
| GT spread peak | | -0.130\*\*\* | | -0.037\*\*\* | | -0.048\*\*\* | | -0.051\*\*\* | | -0.019\*\*\* | | -0.009\*\*\* | |
|  | | (-0.161 - -0.100) | | (-0.063 - -0.011) | | (-0.075 - -0.021) | | (-0.082 - -0.020) | | (-0.030 - -0.008) | | (-0.012 - -0.006) | |
| Date (mean cent.) | | 0.000 | | -0.001 | | -0.004\*\*\* | | 0.002 | | -0.007\* | | -0.012\*\*\* | |
|  | | (-0.001 - 0.002) | | (-0.003 - 0.001) | | (-0.006 - -0.002) | | (-0.002 - 0.006) | | (-0.013 - 0.000) | | (-0.019 - -0.005) | |
| GT spread peak\*Date | | -0.006\*\*\* | | -0.007\*\*\* | | -0.003 | | -0.013\*\*\* | | -0.012\*\*\* | | -0.007\*\*\* | |
|  | | (-0.008 - -0.004) | | (-0.010 - -0.003) | | (-0.006 - 0.001) | | (-0.019 - -0.008) | | (-0.020 - -0.003) | | (-0.011 - -0.003) | |
| Spread | | -0.003 | | -0.013\*\*\* | | -0.000 | | -0.005\*\*\* | | 0.003\* | | 0.004\*\*\* | |
|  | | (-0.017 - 0.010) | | (-0.022 - -0.004) | | (-0.008 - 0.007) | | (-0.009 - -0.002) | | (-0.000 - 0.006) | | (0.002 - 0.006) | |
| Constant | | 4.040\*\*\* | | 4.021\*\*\* | | 3.969\*\*\* | | 4.014\*\*\* | | 3.962\*\*\* | | 3.947\*\*\* | |
|  | | (3.988 - 4.093) | | (3.982 - 4.060) | | (3.938 - 4.001) | | (3.983 - 4.046) | | (3.942 - 3.982) | | (3.936 - 3.957) | |
| N | | 2,601 | | 1,224 | | 816 | | 408 | | 204 | | 102 | |
| R-squared | | 0.760 | | 0.749 | | 0.726 | | 0.700 | | 0.691 | | 0.630 | |
| N Regions | | 17 | | 17 | | 17 | | 17 | | 17 | | 17 | |
| BIC | | -4383.22 | | -3056.57 | | -2359.55 | | -1417.52 | | -804.83 | | -486.51 | |
| **(b)**  **Global Polynomial** | | | | | | | | | | | | | |
|  | Model | | Model | | Model | | Model | | Model | | Model | | Model |
|  | (1) | | (2) | | (3) | | (4) | | (5) | | (6) | | (7) |
| GT spread peak | -0.047\*\*\* | | -0.030\* | | -0.049\*\* | | -0.024 | | -0.044\*\*\* | | -0.052\*\*\* | | -0.034\* |
|  | (-0.075 - -0.019) | | (-0.064 - 0.004) | | (-0.087 - -0.012) | | (-0.063 - 0.015) | | (-0.075 - -0.014) | | (-0.087 - -0.017) | | (-0.069 - 0.002) |
| Date (mean cent.) | -0.006\*\*\* | | 0.000 | | 0.004 | | 0.001 | | 0.032\*\*\* | | 0.042\*\*\* | | 0.020\* |
|  | (-0.009 - -0.004) | | (-0.005 - 0.006) | | (-0.006 - 0.013) | | (-0.011 - 0.013) | | (0.012 - 0.052) | | (0.017 - 0.068) | | (-0.001 - 0.041) |
| Date squared | -0.000\*\*\* | | 0.000 | | 0.000 | | -0.000 | | 0.004\*\*\* | | 0.005\*\*\* | | 0.002 |
|  | (-0.000 - -0.000) | | (-0.000 - 0.000) | | (-0.000 - 0.001) | | (-0.001 - 0.001) | | (0.002 - 0.006) | | (0.002 - 0.009) | | (-0.000 - 0.004) |
| Date cubic |  | | 0.000\*\* | | 0.000 | | -0.000 | | 0.000\*\*\* | | 0.000\*\*\* | | 0.000 |
|  |  | | (0.000 - 0.000) | | (-0.000 - 0.000) | | (-0.000 - 0.000) | | (0.000 - 0.000) | | (0.000 - 0.000) | | (-0.000 - 0.000) |
| Date order 4 |  | |  | | 0.000 | | -0.000 | | 0.000\*\*\* | | 0.000\*\*\* | | 0.000 |
|  |  | |  | | (-0.000 - 0.000) | | (-0.000 - 0.000) | | (0.000 - 0.000) | | (0.000 - 0.000) | | (-0.000 - 0.000) |
| Date order 5 |  | |  | |  | | -0.000 | | 0.000\*\*\* | | 0.000\*\* | | -0.000 |
|  |  | |  | |  | | (-0.000 - 0.000) | | (0.000 - 0.000) | | (0.000 - 0.000) | | (-0.000 - 0.000) |
| Date order 6 |  | |  | |  | |  | | 0.000\*\*\* | | 0.000\*\* | | -0.000\*\*\* |
|  |  | |  | |  | |  | | (0.000 - 0.000) | | (0.000 - 0.000) | | (-0.000 - -0.000) |
| Date order 7 |  | |  | |  | |  | |  | | 0.000\* | | 0.000 |
|  |  | |  | |  | |  | |  | | (-0.000 - 0.000) | | (-0.000 - 0.000) |
| Date order 8 |  | |  | |  | |  | |  | |  | | 0.000 |
|  |  | |  | |  | |  | |  | |  | | (-0.000 - 0.000) |
| GT spread peak\*Date | -0.000 | | -0.013\*\* | | -0.006 | | -0.011 | | -0.067\*\*\* | | -0.085\*\*\* | | -0.047\*\*\* |
|  | (-0.004 - 0.003) | | (-0.023 - -0.003) | | (-0.019 - 0.006) | | (-0.026 - 0.003) | | (-0.095 - -0.040) | | (-0.124 - -0.047) | | (-0.068 - -0.026) |
| GT spread peak\*Date squared | 0.000\*\*\* | | 0.000 | | -0.001\*\* | | 0.000 | | -0.000 | | -0.000 | | 0.000 |
|  | (0.000 - 0.000) | | (-0.000 - 0.000) | | (-0.001 - -0.000) | | (-0.001 - 0.001) | | (-0.002 - 0.002) | | (-0.002 - 0.001) | | (-0.004 - 0.005) |
| GT spread peak\*Date cubic |  | | -0.000\*\*\* | | 0.000\*\* | | -0.000 | | -0.000\*\*\* | | -0.001\*\*\* | | -0.000\*\*\* |
|  |  | | (-0.000 - -0.000) | | (0.000 - 0.000) | | (-0.000 - 0.000) | | (-0.001 - -0.000) | | (-0.001 - -0.000) | | (-0.000 - -0.000) |
| GT spread peak\*Date order 4 |  | |  | | -0.000\*\*\* | | 0.000 | | 0.000 | | 0.000 | | 0.000 |
|  |  | |  | | (-0.000 - -0.000) | | (-0.000 - 0.000) | | (-0.000 - 0.000) | | (-0.000 - 0.000) | | (-0.000 - 0.000) |
| GT spread peak\*Date order 5 |  | |  | |  | | -0.000 | | -0.000\*\*\* | | -0.000\*\* | |  |
|  |  | |  | |  | | (-0.000 - 0.000) | | (-0.000 - -0.000) | | (-0.000 - -0.000) | |  |
| GT spread peak\*Date order 6 |  | |  | |  | |  | | 0.000 | |  | |  |
|  |  | |  | |  | |  | | (-0.000 - 0.000) | |  | |  |
| GT spread peak\*Date order 7 |  | |  | |  | |  | |  | | -0.000\* | |  |
|  |  | |  | |  | |  | |  | | (-0.000 - 0.000) | |  |
| GT spread peak\*Date order 8 |  | |  | |  | |  | |  | |  | | -0.000 |
|  |  | |  | |  | |  | |  | |  | | (-0.000 - 0.000) |
| Spread | 0.005 | | -0.006 | | -0.021\*\*\* | | -0.022\*\*\* | | -0.025\*\*\* | | -0.025\*\*\* | | -0.025\*\*\* |
|  | (-0.004 - 0.014) | | (-0.018 - 0.007) | | (-0.035 - -0.007) | | (-0.033 - -0.011) | | (-0.037 - -0.013) | | (-0.037 - -0.014) | | (-0.036 - -0.013) |
| Constant | 3.940\*\*\* | | 4.007\*\*\* | | 4.058\*\*\* | | 4.054\*\*\* | | 4.129\*\*\* | | 4.146\*\*\* | | 4.106\*\*\* |
|  | (3.895 - 3.985) | | (3.933 - 4.081) | | (3.968 - 4.149) | | (3.972 - 4.136) | | (4.039 - 4.220) | | (4.044 - 4.249) | | (4.014 - 4.198) |
| N | 2,601 | | 2,601 | | 2,601 | | 2,601 | | 2,601 | | 2,601 | | 2,601 |
| R-squared | 0.774 | | 0.777 | | 0.780 | | 0.780 | | 0.784 | | 0.785 | | 0.784 |
| N Regions | 17 | | 17 | | 17 | | 17 | | 17 | | 17 | | 17 |
| BIC | -4383.22 | | -4525.13 | | -4548.13 | | -4564.69 | | -4562.52 | | -4613.09 | | -4603.11 |

Source: Istat and Google data (2020). Note: Whole sample covers births in April 2006-December 2018; Symmetric 3 years sample covers births in August 2009-August 2015; Symmetric 2 years sample covers births in August 2010-August 2014; Symmetric 1 year sample covers births in August 2011-August 2013; Symmetric 6 months sample covers births in February 2012-February 2013; Symmetric 3 months sample covers births in May 2012-Novermber 2012. Global Polynomial models are run on the whole sample. Blank estimates are omitted for collinearity. Robust standard errors. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

**Potential confounders**

Table B.3 reports National estimates of the effect of GT peak on birth rates from the optimal BIC selected models from the main analysis (Tables A.2-A.4): the whole sample LLR and the 4th order global polynomial, where we additionally control for other potential confounding factors beside the Spread, namely unemployment rate, Consumer Confidence Index (CCI) and GT searches for the term ‘spread’. Except for Model 2 in the LLR models where, considering the entire observation period and a linear model, controlling from unemployment results in a substantially reduced coefficient (also statistically not significant), all other models show a very similar treatment effect to the main estimates.

The crude birth rate is the only available indicator of fertility for Italy at the regional level and on a monthly basis; however, it is affected by the population structure and in particular by the age structure of women in reproductive ages (Kent & Haub 1984). To partially account for this, we have constructed an index of ageing structures of women in their reproductive age to account for the turnover between older and younger women (calculated as []). An additional factor to consider when using regional data is the diversity across Italian territory in Internet access, which might introduce relevant biases to the representativeness of the data. In 2005, households’ access to the Internet varied from only 23% in Sicily to 40% in Lazio (Istat). In 2018, 81% of households in Trentino but only 66% of households in Calabria had Internet access at home (Istat). To account for this, we have added a correction factor to the GT variable that weights the queries on the basis of households’ Internet access in the region.

(B.1)

The correction proposed in Equation (B.1) equals 1 in the region-year with the highest proportion of Internet users and moves towards 0 as the percentage of Internet users declines. This means that the maximum searches now do not reach 100, but 64.8; however, the date of the peak in searches does not vary.

Table B.4 reports Regional fixed effects estimates of the effect of GT peak on birth rates from the optimal BIC selected models from the main analysis (Tables A.3-A.5): the 3 months bandwidth LLR and the 2nd order global polynomial, controlling for changes in unemployment rate, GT Index corrected for regional internet access and changes in the age structure of women in reproductive age. Except for Model 3 in the LLR models, in which controlling from GT Index (in the three months symmetric window) results in a statistically not significant estimate (with rising GT Index negatively associated with birth rates), the estimates of the discontinuity remain in a very similar rage compared to the main models.

**Table B.3: GT spread peak effect on birth rates. National-level Whole sample LLR and 4th order Global Polynomial estimates controlling for confounding variables**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **(a)**  **LLR** | | | |
|  | Model | Model | Model | Model |
|  | (1) | (2) | (3) | (4) |
|  |  |  |  |  |
| GT spread peak | -0.152\*\*\* | -0.019 | -0.152\*\*\* | -0.160\*\*\* |
|  | (-0.218 - -0.086) | (-0.099 - 0.061) | (-0.239 - -0.064) | (-0.233 - -0.087) |
| Date (mean cent.) | 0.000 | 0.002\*\* | 0.000 | 0.000 |
|  | (-0.001 - 0.002) | (0.000 - 0.003) | (-0.001 - 0.002) | (-0.001 - 0.002) |
| GT spread peak \*Date | -0.006\*\*\* | -0.008\*\*\* | -0.006\*\*\* | -0.006\*\*\* |
|  | (-0.007 - -0.004) | (-0.010 - -0.005) | (-0.008 - -0.003) | (-0.008 - -0.003) |
| Spread |  | -0.017 | 0.000 | -0.002 |
|  |  | (-0.039 - 0.005) | (-0.028 - 0.028) | (-0.034 - 0.029) |
| Unemployment rate |  | -0.033\*\*\* |  |  |
|  |  | (-0.048 - -0.018) |  |  |
| CCI |  |  | 0.000 |  |
|  |  |  | (-0.003 - 0.003) |  |
| GT spread |  |  |  | 0.000 |
|  |  |  |  | (-0.001 - 0.002) |
| Constant | 4.092\*\*\* | 4.408\*\*\* | 4.086\*\*\* | 4.094\*\*\* |
|  | (4.036 - 4.148) | (4.239 - 4.577) | (3.736 - 4.436) | (4.021 - 4.168) |
| N | 153 | 153 | 153 | 153 |
| R-squared | 0.930 | 0.941 | 0.930 | 0.930 |
| BIC | -444.36 | -461.61 | -434.30 | -434.55 |
|  | **(b)**  **Global Polynomial** | | | |
|  | Model | Model | Model | Model |
|  | (1) | (3) | (4) | (5) |
|  |  |  |  |  |
| GT spread peak | -0.091\*\*\* | -0.079\*\*\* | -0.111\*\*\* | -0.093\*\*\* |
|  | (-0.121 - -0.061) | (-0.113 - -0.045) | (-0.165 - -0.056) | (-0.153 - -0.034) |
| Date (mean cent.) | -0.001 | -0.005 | -0.000 | -0.003 |
|  | (-0.007 - 0.004) | (-0.017 - 0.007) | (-0.015 - 0.015) | (-0.015 - 0.010) |
| GT spread peak \*Date | 0.001 | 0.010 | 0.004 | 0.002 |
|  | (-0.006 - 0.008) | (-0.009 - 0.030) | (-0.013 - 0.021) | (-0.014 - 0.019) |
| Date squared | 0.000 | -0.000 | 0.000 | 0.000 |
|  | (-0.000 - 0.000) | (-0.001 - 0.000) | (-0.000 - 0.001) | (-0.001 - 0.001) |
| Date cubic | 0.000 | -0.000 | 0.000 | 0.000 |
|  | (-0.000 - 0.000) | (-0.000 - 0.000) | (-0.000 - 0.000) | (-0.000 - 0.000) |
| Date order 4 | 0.000 | -0.000 | 0.000 | 0.000 |
|  | (-0.000 - 0.000) | (-0.000 - 0.000) | (-0.000 - 0.000) | (-0.000 - 0.000) |
| GT spread peak\*Date squared | -0.001\*\*\* | -0.001\* | -0.001\*\* | -0.001\* |
|  | (-0.001 - -0.000) | (-0.001 - 0.000) | (-0.002 - -0.000) | (-0.001 - 0.000) |
| GT spread peak\*Date cubic | 0.000\*\* | 0.000\*\*\* | 0.000\*\*\* | 0.000\*\* |
|  | (0.000 - 0.000) | (0.000 - 0.000) | (0.000 - 0.000) | (0.000 - 0.000) |
| GT spread peak\*Date order 4 | -0.000\*\*\* | -0.000\*\* | -0.000\*\* | -0.000\*\* |
|  | (-0.000 - -0.000) | (-0.000 - -0.000) | (-0.000 - -0.000) | (-0.000 - -0.000) |
| Spread |  | 0.008 | 0.009 | 0.005 |
|  |  | (-0.024 - 0.041) | (-0.025 - 0.044) | (-0.030 - 0.041) |
| Unemployment rate |  | -0.018 |  |  |
|  |  | (-0.042 - 0.007) |  |  |
| CCI |  |  | 0.002 |  |
|  |  |  | (-0.000 - 0.004) |  |
| GT spread |  |  |  | -0.000 |
|  |  |  |  | (-0.001 - 0.001) |
| Constant | 4.039\*\*\* | 4.152\*\*\* | 3.858\*\*\* | 4.020\*\*\* |
|  | (4.017 - 4.061) | (3.943 - 4.361) | (3.635 - 4.080) | (3.883 - 4.158) |
| N | 153 | 153 | 153 | 153 |
| R-squared | 0.956 | 0.956 | 0.956 | 0.956 |
| BIC | -494.27 | -486.00 | -486.45 | -484.37 |

Source: Istat and Google data (2020). Note: Whole sample covers births in April 2006-December 2018. Standard errors clustered by years. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

**Table B.4: GT spread peak effect on birth rates. Regional-level 3-months LLR and 2nd order Global Polynomial estimates controlling for confounding variables**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **(a)**  **LLR** | | | | |
|  | Model | Model | Model | Model |
|  | (1) | (2) | (3) | (4) |
|  |  |  |  |  |
| GT spread peak | -0.053\*\*\* | -0.055\*\*\* | 0.008 | -0.057\*\*\* |
|  | (-0.075 - -0.031) | (-0.089 - -0.022) | (-0.031 - 0.048) | (-0.092 - -0.022) |
| Date (mean cent.) | 0.001 | 0.004 | -0.012 | -0.002 |
|  | (-0.008 - 0.011) | (-0.016 - 0.025) | (-0.034 - 0.011) | (-0.022 - 0.018) |
| GT spread peak \*Date | -0.043\*\*\* | -0.044\*\*\* | -0.049\*\*\* | -0.038\*\* |
|  | (-0.056 - -0.030) | (-0.074 - -0.014) | (-0.082 - -0.016) | (-0.073 - -0.003) |
| Spread |  | -0.000 | 0.028 | 0.006 |
|  |  | (-0.031 - 0.031) | (-0.014 - 0.071) | (-0.028 - 0.041) |
| Unemployment rate |  | -0.003 |  |  |
|  |  | (-0.013 - 0.007) |  |  |
| GT\*Internet Access |  |  | -0.002\*\*\* |  |
|  |  |  | (-0.003 - -0.001) |  |
| Age structure |  |  |  | 0.002 |
|  |  |  |  | (-0.011 - 0.015) |
| Constant | 3.981\*\*\* | 4.015\*\*\* | 3.864\*\*\* | 3.800\*\*\* |
|  | (3.964 - 3.999) | (3.828 - 4.202) | (3.673 - 4.055) | (2.776 - 4.823) |
| N | 102 | 102 | 102 | 102 |
| R-squared | 0.816 | 0.818 | 0.842 | 0.816 |
| N Regions | 17 | 17 | 17 | 17 |
| BIC | -451.45 | -443.41 | -457.98 | -442.37 |
| **(b)**  **Global Polynomial** | | | | |
|  | Model | Model | Model | Model |
|  | (1) | (2) | (3) | (4) |
|  |  |  |  |  |
| GT spread peak | -0.058\*\*\* | -0.128\*\*\* | -0.078\*\*\* | -0.092\*\*\* |
|  | (-0.078 - -0.039) | (-0.197 - -0.058) | (-0.116 - -0.040) | (-0.110 - -0.075) |
| Date (mean cent.) | -0.005\*\*\* | -0.008\*\*\* | -0.008\*\*\* | -0.006\*\*\* |
|  | (-0.007 - -0.003) | (-0.011 - -0.004) | (-0.011 - -0.005) | (-0.009 - -0.004) |
| Date squared | -0.000\*\*\* | -0.000\*\*\* | -0.000\*\*\* | -0.000\*\*\* |
|  | (-0.000 - -0.000) | (-0.000 - -0.000) | (-0.000 - -0.000) | (-0.000 - -0.000) |
| GT spread peak \*Date | -0.000 | 0.005\*\*\* | 0.005\*\* | 0.003 |
|  | (-0.003 - 0.002) | (0.002 - 0.009) | (0.001 - 0.009) | (-0.001 - 0.006) |
| GT spread peak\*Date squared | 0.000\*\*\* | 0.000\*\*\* | 0.000\*\*\* | 0.000\*\*\* |
|  | (0.000 - 0.000) | (0.000 - 0.000) | (0.000 - 0.000) | (0.000 - 0.000) |
| Spread |  | 0.027\*\*\* | 0.029\*\*\* | 0.017\*\*\* |
|  |  | (0.012 - 0.042) | (0.020 - 0.037) | (0.009 - 0.025) |
| Unemployment rate |  | 0.007 |  |  |
|  |  | (-0.016 - 0.031) |  |  |
| GT\*Internet Access |  |  | -0.002\*\* |  |
|  |  |  | (-0.003 - -0.001) |  |
| Age structure |  |  |  | -0.006 |
|  |  |  |  | (-0.023 - 0.012) |
| Constant | 3.961\*\*\* | 3.825\*\*\* | 3.908\*\*\* | 4.347\*\*\* |
|  | (3.930 - 3.993) | (3.574 - 4.076) | (3.861 - 3.955) | (3.047 - 5.646) |
| N | 2,601 | 2,601 | 2,098 | 2,550 |
| R-squared | 0.776 | 0.780 | 0.807 | 0.772 |
| N Regions | 17 | 17 | 17 | 17 |
| BIC | -4642.17 | -4673.89 | -4004.25 | -4676.71 |

Source: Istat and Google data (2020). Note: Whole sample covers births in April 2006-December 2018; Symmetric 3 months sample covers births in May 2012-November 2013. Robust standard errors. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1.

**Placebo treatments**

Finally, a placebo treatment on the monthly crude marriage rate nine months after the peak in uncertainty is tested. While marriage rates are likely to be negatively influenced by economic uncertainty, due to a similar argument regarding childbearing (although marriages are reversible, at a certain cost), there is no reason to expect that this negative effect of uncertainty materialises nine months after the uncertainty shock, as is the case for childbearing. Figure B.1 illustrates both LLR and Global Polynomial estimates of the effects of the GT spread peak on marriage rates in Italy using national-level data, varying the bandwidth and polynomial order respectively (monthly marriage rates at the regional level were not available at the time of writing). The figure shows that, as expected, the uncertainty shock had no effect on the national marriage rate. Finally, Figure B.2 shows that the drop in birth rates is not present when considering other cut-off dates — either in November in the years between 2009-2013, or in the other months of 2011-2012 (with the exception of the months just preceding and following November 2011). These births would have occurred around July-September 2012, so we can attribute these additional drops to measurement errors in the conception dates. Additional estimates on years before the crisis (2004-2006, available upon request) show either positive or no changes in birth rates.

**Figure B.1: GT spread peak LLP and polynomial coefficients plot on marriage rate. National-level data**

Source: Elaboration of the author based on Istat data.

**Figure B.2: GT spread peak LLP plot on different dates. National-level data**

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Source: Elaboration of the author based on Istat data.